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Deep-sea Decapod Crustaceans from off the Japanese Coast of the Sea of Japan

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Abstract: Decapod crustaceans from off the Japanese coast of the Sea of Japan, collected during a five-year project of the National Museum of Nature and Science, Tokyo, "Research on Deep-sea Fauna of the Sea of Japan," are reported. The collection consists of one species of dendrobranchiate Penaeidae, 22 species of three caridean families (Crangonidae, Hippolytidae and Pandalidae), four species of anomuran Paguridae, and four species of brachyuran Oregoniidae. Of these one crangonid species, *Paracrangon* sp., could not be identified with any previously known species. Male specimens of crangonid species, *Metacrangon obliqua* Komai, 2012, and hippolytid species, *Lebbeus polyacanthus* Komai, Hayashi and Kohtsuka, 2004, are recorded for the first time. The biogeography and the bathymetric distribution of the recorded species are briefly discussed.

Key words: Crustacea, Decapoda, Dendrobranchiata, Caridea, Anomura, Brachyura.

Introduction

Knowledge on the decapod crustacean fauna in the Japanese coast of the Sea of Japan has been accumulated and reviewed by Motoh (2003, 2007, 2008) with a total of 565 species. But the deep-water decapod crustacean fauna is at present only known from rather a few studies, although the area constitutes a major fishery ground in our country. The first organized biological survey of the continental shelf of Japan, conducted by S. S. *Soyo-maru* of the Imperial Fishery Experimental Station of Tokyo, during 1923–1930, included the Sea of Japan. A collection of decapod crustaceans made by this survey was reported by Yokoya (1933), in which twenty-two species were recorded from the Sea of Japan at depths greater than 200 m. Other published works containing collections from the area include Kikuchi (1932), Rathbun (1932), Urita (1934), Yamamoto (1950), Miyake (1957, 1982), Kamita (1963), Kishida (1963), Miyake and Hayashi (1967), Hayashi (1976, 1977, 1992a, 2010), Omori (1976), Suzuki (1979), Doi (1989), Honma and Muraoka (1992), Komai and Amaoka (1992), Komai (1994, 1997, 1999, 2012), Kim and Natsukari (2000), Kim and Komai (2002), Komai and Kim (2004), Komai *et al.* (2004), Motoh and Toyoda (2005), Asakura (2006), Motoh and Yamaguchi (2009), Motoh *et al.* (2011), and Takeda *et al.* (2011).

Since 2009, in cooperation with the Fisheries Research Agency (FRA), the National Museum and Nature and Science, Tokyo, has been carrying out a series of trawl surveys along the western coast of Honshu, extending from Akita Prefecture to Shimane Prefecture, with the purpose of understanding the faunal component and distribution of organisms in the bathyal zone down to 2300 m. The present paper is a report on the decapod crustaceans collected in 2009 and 2010

using T/V *Tanshu-maru* of Kasumi High School, Hyogo Prefecture. Material collected during the KT-10-8, KT-11-18 and KT-11-9 cruises of R/V *Tansei-maru* of the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) to the Sea of Japan and further cruises in 2007, 2010, 2012, and 2013 of R/V *Soyo-maru* (FRA) is also included to the collections, as these collections contain samples from continental shelf to bathyal zone to 2400 m. Thirty-two species are recorded here, of which one crangonid species is not identified as any previously known species. The collections of decapod crustaceans are referred to one species of one dendrobranchiate family (Penaeidae), 22 species of three caridean families (Crangonidae, Hippolytidae and Pandalidae), four species of one anomuran family (Paguridae), and four species of one brachyuran family (Oregoniidae). Of these one crangonid species, *Paracrangon* sp., could not be identified with any previously known species. Male specimens of one crangonid species, *Metacrangon obliqua* Komai, 2012, and one hippolytid species, *Lebbeus polyacanthus* Komai, Hayashi and Kohtsuka, 2004, are recorded for the first time.

Materials and Methods

This study primarily deals with the specimens of decapod crustaceans collected from off the Japanese coast of the Sea of Japan, using T/V *Tanshu-maru* of Kasumi High School, Hyogo Prefecture (used gears include otter trawl and beam trawl with 8 m span opening), R/V *Tansei-maru* of the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) (used gear was beam trawl with 3 m span opening) and R/V *Soyo-maru* of the FRA (used gear was beam trawl, dredge and baited trap). Data of sampling stations of T/V *Tanshu-maru* and R/Vs *Tansei-maru* and *Soyo-maru* are summarized in Tables 1–3, respectively. Only representative specimens were preserved for species by species at each station as voucher, and therefore the numbers of specimens do not reflect the real abundance. Since the fishery important species, *Chionoecetes opilio* and *C. japonicus*, were used for a resource stock assessment by the FRA, only a few specimens were preserved for these species. Specimens were fixed in 80% ethanol or 10% formalin and preserved in 75% ethanol. All the specimens examined are deposited in the National Museum of Nature and Science, Tsukuba (NSMT).

Measurements of specimens are provided as follows: the postorbital carapace length (cl) for shrimps, the shield length (sl) for hermit crabs, and the carapace breadth (cb) brachyuran crabs. In the brachyuran crabs, the carapace breadth was measured across the greatest breadth excluding lateral spines. Synonymy is restricted to the records from the Japanese coast of the Sea of Japan occurring at depths greater than 200 m. Within each suborder or infraorder, families, genera and species are arranged in alphabetical order. When possible, size of specimens is summarized for each species. For carideans, maximum size is given for each sex, and size range of ovigerous females, are given. Other abbreviations used in the text are: juv., juvenile; ovig., ovigerous.

Table 1. Sampling data of T/S *Tanshu-maru* cruises. Abbreviations for sampling gear: OT, otter trawl; BZ and ZY, beam trawl.

Stn. no.	Date	Gear	Position in	Position out	Depth (m)	Locality
TS09-T001	9 May 2009	OT	35°43.56′N, 131°06.41′E	35°42.96′N, 131°04.81′E	227–224	off Hamada
TS09-T002	10 May 2009	OT	35°49.86′N, 131°28.63′E	35°50.10′N, 131°26.81′E	248–248	off Hamada
TS09-T003	10 May 2009	OT	35°47.01′N, 131°33.11′E	35°47.77′N, 131°31.52′E	228–229	off Hamada
TS09-T004	10 May 2009	OT	35°51.03′N, 131°34.58′E	35°51.09′N, 131°34.19′E	280–279	off Hamada
TS09-T006	9 May 2009	OT	35°53.59′N, 131°28.46′E	35°53.50′N, 131°26.62′E	342–329	off Hamada
TS09-T007	10 May 2009	OT	35°53.46′N, 131°33.78′E	35°53.32′N, 131°34.55′E	339–339	off Hamada
TS09-T008	11 May 2009	OT	35°37.75′N, 132°04.41′E	35°37.79′N, 132°06.24′E	208–208	off Oda
TS09-T012	11 May 2009	OT	35°43.46′N, 132°05.83′E	35°43.34′N, 132°07.66′E	251–251	off Oda
TS09-T034	14 May 2009	OT	35°53.75′N, 132°32.75′E	35°55.16′N, 132°33.35′E	210–210	W off Oki Is.
TS09-T046	1 June 2009	OT	36°14.15′N, 133°44.54′E	36°15.59′N, 133°44.03′E	208–208	E off Oki Is.
TS09-T047	1 June 2009	OT	36°08.90′N, 133°46.83′E	36°07.75′N, 133°47.49′E	207–207	E off Oki Is.
TS09-T048	1 June 2009	OT	36°04.44′N, 133°49.75′E	36°02.97′N, 133°50.06′E	211–212	E off Oki Is.
TS09-T051	2 June 2009	OT	35°54.83′N, 133°50.71′E	35°53.33′N, 133°50.64′E	206–206	SE off Oki Is.
TS09-T056	1 June 2009	OT	36°17.05′N, 133°53.20′E	36°15.74′N, 133°53.96′E	358–352	E off Oki Is.
TS09-T088	3 June 2009	OT	35°49.20′N, 134°51.89′E	35°49.25′N, 134°52.56′E	200–200	W off Tango Pen.
TS09-T089	4 June 2009	OT	35°56.48′N, 134°49.97′E	35°56.54′N, 134°51.50′E	250–251	NW off Tango Pen.
TS09-T096	4 June 2009	OT	36°13.18′N, 134°52.63′E	36°14.14′N, 134°54.07′E	432–430	NW off Tango Pen.
TS09-T098	5 June 2009	OT	35°55.61′N, 135°05.94′E	35°55.96′N, 135°07.73′E	251–251	N off Tango Pen.
TS09-T099	5 June 2009	OT	36°02.18′N, 135°12.16′E	36°02.19′N, 135°14.01′E	283–284	N off Tango Pen.
TS09-T100	5 June 2009	OT	36°04.74′N, 135°15.12′E	36°05.10′N, 135°16.92′E	291–292	N off Tango Pen.
TS09-T102	30 May 2009	OT	35°53.27′N, 135°48.27′E	35°53.02′N, 135°47.72′E	242–242	Wakasa Bay
TS09-T103	31 May 2009	OT	36°01.94′N, 135°33.56′E	36°02.04′N, 135°35.40′E	280–280	Wakasa Bay
TS09-T104	30 May 2009	OT	35°55.25′N, 135°46.77′E	35°55.22′N, 135°46.45′E	261–262	Wakasa Bay
TS09-T105	31 May 2009	OT	36°06.43′N, 135°43.39′E	36°05.13′N, 135°42.46′E	292–291	Wakasa Bay
TS09-T106	30 May 2009	OT	36°01.78′N, 135°42.77′E	36°01.22′N, 135°44.51′E	272–271	Wakasa Bay
TS09-T107	30 May 2009	OT	36°09.30′N, 135°54.87′E	36°08.43′N, 135°54.91′E	202–201	off Fukui
TS09-T109	6 June 2009	OT	36°20.50′N, 135°11.87′E	36°21.47′N, 135°10.46′E	386–386	N off Tango Pen.
TS09-T111	31 May 2009	OT	36°06.03′N, 135°35.44′E	36°06.63′N, 135°37.13′E	336–338	Wakasa Bay
TS09-T114	6 June 2009	OT	36°25.96′N, 135°12.10′E	36°26.67′N, 135°10.39′E	481–478	N off Tango Pen.
TS09-T115	6 June 2009	OT	36°15.29′N, 135°30.95′E	36°15.67′N, 135°29.16′E	451–452	NE off Tango Pen.
TS09-OW01	19 August 2009	ZY	35°39.77′N, 132°19.75′E	35°39.89′N, 132°20.03′E	199–199	W off Oki Is.
TS09-OW04	19 August 2009	ZY	35°53.37′N, 132°14.99′E	35°53.31′N, 132°14.73′E	500–499	W off Oki Is.
TS09-OW05	19 August 2009	ZY	35°54.66′N, 132°14.63′E	35°54.58′N, 132°14.42′E	604–602	W off Oki Is.
TS09-OW06	19 August 2009	ZY	35°55.30′N, 132°13.15′E	35°55.12′N, 132°12.66′E	701–696	W off Oki Is.
TS09-OW07	24 August 2009	ZY	35°56.07′N, 132°10.83′E	35°55.97′N, 132°11.37′E	800–801	W off Oki Is.
TS09-OW08	24 August 2009	ZY	35°57.96′N, 132°13.05′E	35°58.17′N, 132°13.53′E	897–908	W off Oki Is.
TS09-OW09	24 August 2009	ZY	35°58.93′N, 132°12.28′E	35°59.06′N, 132°12.83′E	997–1001	W off Oki Is.
TS09-OW10	24 August 2009	ZY	36°01.24′N, 132°12.43′E	36°01.21′N, 132°13.03′E	1100–1101	W off Oki Is.
TS09-OW11	24 August 2009	ZY	36°05.30′N, 132°13.78′E	36°05.48′N, 132°14.31′E	1204–1204	W off Oki Is.
TS09-OW12	23 August 2009	ZY	36°09.88′N, 132°11.48′E	36°10.12′N, 132°11.98′E	1299–1298	W off Oki Is.
TS09-OW13	23 August 2009	ZY	36°13.06′N, 132°08.71′E	36°13.34′N, 132°09.21′E	1408–1396	W off Oki Is.
TS09-OW15	23 August 2009	ZY	36°16.14′N, 131°58.77′E	36°16.57′N, 131°59.01′E	1600–1597	W off Oki Is.
TS09-OW28	26 August 2009	ZY	36°12.95′N, 132°34.97′E	36°12.16′N, 132°34.89′E	601–598	W off Oki Is.
TS09-OW29	26 August 2009	ZY	36°12.48′N, 132°33.60′E	36°12.05′N, 132°33.52′E	697–702	W off Oki Is.
TS09-OW30	26 August 2009	ZY	36°08.72′N, 132°33.77′E	36°08.48′N, 132°33.44′E	796–796	W off Oki Is.
TS09-OW31	26 August 2009	ZY	36°07.19′N, 132°29.53′E	36°07.00′N, 132°29.06′E	888–900	W off Oki Is.
TS09-OW32	25 August 2009	ZY	36°10.65′N, 132°28.19′E	36°10.22′N, 132°28.02′E	1008–1007	W off Oki Is.
TS09-OW33	25 August 2009	ZY	36°13.58′N, 132°26.30′E	36°13.19′N, 132°26.53′E	1090–1082	W off Oki Is.
TS09-OW34	25 August 2009	ZY	36°08.64′N, 132°19.53′E	36°08.85′N, 132°20.01′E	1200–1190	W off Oki Is.
TS09-OW35	25 August 2009	ZY	36°15.66′N, 132°17.41′E	36°16.04′N, 132°17.78′E	1295–1295	W off Oki Is.
TS09-OW36	25 August 2009	ZY	36°16.24′N, 132°11.40′E	36°16.48′N, 132°11.91′E	1400–1396	W off Oki Is.
TS09-OW37	25 August 2009	ZY	36°22.52′N, 132°11.64′E	36°22.97′N, 132°11.79′E	1500–1497	W off Oki Is.
TS09-OW38	26 August 2009	ZY	36°16.25′N, 132°36.27′E	36°15.76′N, 132°36.12′E	600–604	W off Oki Is.
TS09-OW39	26 August 2009	ZY	36°16.45′N, 132°35.15′E	36°16.08′N, 132°35.02′E	702–704	W off Oki Is.
TS09-OW40	28 August 2009	ZY	36°14.04′N, 132°32.72′E	36°13.70′N, 132°32.44′E	795–800	W off Oki Is.
TS09-OW42	28 August 2009	ZY	36°16.76′N, 132°28.36′E	36°16.65′N, 132°27.86′E	1000–1015	W off Oki Is.
TS09-OW43	27 August 2009	ZY	36°18.10′N, 132°26.43′E	36°17.72′N, 132°26.15′E	1097–1090	W off Oki Is.
TS09-OW44	27 August 2009	ZY	36°17.34′N, 132°23.04′E	36°12.11′N, 132°22.70′E	1200–1197	W off Oki Is.
TS09-OW45	27 August 2009	ZY	36°22.09′N, 132°21.22′E	36°22.44′N, 132°21.61′E	1295–1288	W off Oki Is.
TS09-OW46	27 August 2009	ZY	36°20.51′N, 132°16.54′E	36°20.93′N, 132°16.81′E	1397–1397	W off Oki Is.
TS09-OW47	27 August 2009	ZY	36°27.23′N, 132°14.29′E	36°27.71′N, 132°14.61′E	1504–1497	W off Oki Is.
TS10-OW07	28 August 2010	BZ	35°55.98′N, 132°11.46′E	35°55.96′N, 132°12.13′E	803–787	W off Oki Is.
TS10-OW10	28 August 2010	BZ	36°01.13′N, 132°13.71′E	36°01.06′N, 132°14.28′E	1104–1104	W off Oki Is.
TS10-OW11	27 August 2010	BZ	36°05.21′N, 132°13.73′E	36°05.26′N, 132°14.43′E	1201–1197	W off Oki Is.
TS10-OW14	27 August 2010	BZ	36°13.71′N, 132°03.63′E	36°14.14′N, 132°03.77′E	1494–1501	W off Oki Is.
TS10-T09	1 September 2010	BZ	39°13.97′N, 134°51.65′E	39°14.43′N, 134°51.85′E	358–354	Yamato Ridge
TS10-T19	2 September 2010	BZ	39°29.79′N, 135°15.94′E	39°29.92′N, 135°16.60′E	400–400	Yamato Ridge
TS10-T21	2 September 2010	BZ	39°21.60′N, 135°18.12′E	39°21.24′N, 135°17.60′E	349–350	Yamato Ridge
TS10-T25	1 September 2010	BZ	39°28.75′N, 135°03.90′E	39°28.46′N, 135°03.38′E	378–381	Yamato Ridge
TS10-T55	1 September 2010	BZ	39°04.45′N, 134°41.45′E	39°04.29′N, 134°40.90′E	316–328	Yamato Ridge
TS10-YA05	29 August 2010	BZ	39°40.16′N, 136°01.81′E	39°40.57′N, 136°01.44′E	1002–1010	Yamato Ridge
TS10-YA06	29 August 2010	BZ	39°39.40′N, 136°03.50′E	39°38.92′N, 136°03.73′E	1102–1091	Yamato Ridge
TS10-YA07	30 August 2010	BZ	39°38.98′N, 136°04.56′E	39°38.98′N, 136°04.56′E	1200–1206	Yamato Ridge
TS10-YA09	30 August 2010	BZ	39°39.56′N, 136°05.64′E	39°40.15′N, 136°05.42′E	1401–1400	Yamato Ridge
TS10-YA11	31 August 2010	BZ	39°37.98′N, 136°08.67′E	39°37.48′N, 136°08.69′E	1605–1602	Yamato Ridge
TS10-YA16	30 August 2010	BZ	39°51.83′N, 136°20.47′E	39°51.26′N, 136°20.46′E	2098–2106	Yamato Ridge
TS13-YA13	30 August 2013	BZ	39°46.41′N, 136°11.31′E	39°46.31′N, 136°11.95′E	1803–1808	Yamato Ridge

Table 2. Sampling data of R/V *Tansei-maru* KT-10-8, KT-11-8 and KT-11-9 cruises. Abbreviation for sampling gear: BT, beam trawl with 3 m span opening.

Stn. no.	Date	Gear	Position in	Position out	Depth (m)	Locality
KT-10-08-Es1	26 May 2010	BT	42°03.68′N, 139°32.89′E	42°05.09′N, 139°33.96′E	501–535	off Esashi
KT-10-08-Es2	26 May 2010	BT	42°05.07′N, 139°36.40′E	42°03.13′N, 139°36.76′E	670–671	off Esashi
KT-10-08-Es3	26 May 2010	BT	42°03.89′N, 139°40.79′E	42°01.72′N, 139°39.68′E	839–821	off Esashi
KT-10-08-R1	23 May 2010	BT	45°36.25′N, 140°54.73′E	45°35.66′N, 140°54.09′E	178–190	off Rebun I.
KT-10-08-R2	23 May 2010	BT	45°27.25′N, 140°20.90′E	45°26.15′N, 140°21.94′E	402–393	off Rebun I.
KT-10-08-R3	23 May 2010	BT	45°27.21′N, 140°06.48′E	45°26.09′N, 140°08.45′E	615–594	off Rebun I.
KT-10-08-R4	23 May 2010	BT	45°25.45′N, 139°57.25′E	45°23.98′N, 139°57.27′E	710–742	off Rebun I.
KT-10-08-R5	23 May 2010	BT	45°23.90′N, 139°47.95′E	45°22.24′N, 139°46.23′E	889–671	off Rebun I.
KT-10-08-R6	23 May 2010	BT	45°23.03′N, 139°31.93′E	45°22.17′N, 139°28.35′E	1324–1440	off Rebun I.
KT-10-08-T1	21 May 2010	BT	40°53.90′N, 140°00.04′E	40°53.28′N, 139°58.62′E	350–315	off Tsugaru Pen.
KT-10-08-T2	21 May 2010	BT	40°55.82′N, 139°54.84′E	40°53.96′N, 139°53.88′E	679–715	off Tsugaru Pen.
KT-10-08-T3	21 May 2010	BT	40°57.96′N, 139°53.01′E	40°58.86′N, 139°52.87′E	851–839	off Tsugaru Pen.
KT-10-08-T4	22 May 2010	BT	41°12.91′N, 139°47.05′E	41°10.68′N, 139°48.19′E	1584–1704	off Tsugaru Pen.
KT-11-08-R3	23 May 2011	BT	44°05.15′N, 140°00.44′E	44°05.02′N, 140°01.67′E	988–880	off Rumoi
KT-11-09-E1	29 May 2011	BT	41°52.01′N, 139°33.90′E	41°52.94′N, 139°34.33′E	247–222	off Esashi
KT-11-09-E2	29 May 2011	BT	41°50.26′N, 139°34.03′E	41°48.70′N, 139°34.18′E	388–538	off Esashi
KT-11-09-E3	29 May 2011	BT	41°47.46′N, 139°34.49′E	41°48.96′N, 139°34.88′E	635–563	off Esashi
KT-11-09-E4	29 May 2011	BT	42°03.91′N, 139°40.11′E	42°03.38′N, 139°39.98′E	787–802	off Esashi
KT-11-09-K2	3 June 2011	BT	35°46.11′N, 134°30.94′E	35°46.57′N, 134°32.09′E	204–204	off Kasumi
KT-11-09-K3	2 June 2011	BT	35°54.85′N, 134°18.60′E	35°55.17′N, 134°20.08′E	411–370	off Kasumi
KT-11-09-K4	2 June 2011	BT	35°59.92′N, 134°20.58′E	35°59.61′N, 134°18.82′E	611–613	off Kasumi
KT-11-09-K5	2 June 2011	BT	36°22.25′N, 134°23.61′E	36°20.18′N, 134°22.84′E	1290–1277	off Kasumi
KT-11-09-M2	28 May 2011	BT	44°40.48′N, 140°02.38′E	44°39.53′N, 140°02.83′E	198–206	Musashi Bank
KT-11-09-M3	28 May 2011	BT	44°37.21′N, 139°56.68′E	44°36.29′N, 139°57.82′E	413–407	Musashi Bank
KT-11-09-M4	28 May 2011	BT	44°35.38N, 139°52.93′E	44°34.32′N, 139°53.70′E	608–627	Musashi Bank
KT-11-09-M5	28 May 2011	BT	44°31.41′N, 139°47.13′E	44°29.91′N, 139°47.96′E	1035–1080	Musashi Bank
KT-11-09-M6	28 May 2011	BT	44°16.68′N, 139°36.85′E	44°14.25′N, 139°37.25′E	1461–1421	Musashi Bank
KT-11-09-N2	1 June 2011	BT	37°57.06′N, 136°56.60′E	37°57.04′N, 136°58.23′E	203–203	N off Noto Pen.
KT-11-09-N3	1 June 2011	BT	38°03.25′N, 136°53.39′E	38°03.82′N, 136°55.13′E	403–414	N off Noto Pen.
KT-11-09-N4	1 June 2011	BT	38°08.04′N, 136°49.64′E	38°09.00′N, 136°51.20′E	617–604	N off Noto Pen.
KT-11-09-T2	31 May 2011	BT	37°28.77′N, 137°29.07′E	37°29.53′N, 137°28.63′E	207–258	Toyama Bay
KT-11-09-T3	31 May 2011	BT	37°29.18′N, 137°33.25′E	37°29.35′N, 137°31.96′E	383–443	Toyama Bay
KT-11-09-T4	1 June 2011	BT	37°19.80′N, 137°33.38′E	37°20.02′N, 137°34.20′E	562–574	Toyama Bay
KT-11-09-T5	1 June 2011	BT	37°18.45′N, 137°31.77′E	37°18.66′N, 137°32.85′E	794–790	Toyama Bay
KT-11-09-T6	1 June 2011	BT	37°28.29′N, 137°45.89′E	37°26.70′N, 137°44.59′E	1488–1564	Toyama Bay

Table 3. Sampling data of R/V *Soyo-maru* 2007, 2010, 2012, and 2013 cruises. Abbreviations for sampling gear: BT, beam trawl; TR, baited trap.

Stn. no.	Date	Gear	Position in	Position out	Depth (m)	Locality
SO07-C1	22–23 July 2007	TR	39°24.0′N, 135°12.3′E	39°23.9′N, 135°12.8′E	301–311	Yamato Ridge
SO07-C1-B	22 July 2007	BT	39°24.9′N, 135°14.3′E	39°24.9′N, 135°13.4′E	312–321	Yamato Ridge
SO07-C2	21–22 July 2007	TR	39°56.1′N, 136°03.6′E	39°57.1′N, 136°04.0′E	1290–1297	N of Yamato Ridge
SO07-C2-B	21 July 2007	BT	39°54.6′N, 136°07.8′E	39°56.4′N, 136°07.1′E	1360–1333	N of Yamato Ridge
SO07-C4	25–26 July 2007	TR	42°59.1′N, 139°59.6′E	42°59.2′N, 140°01.9′E	1341–994	off Iwanai
SO07-C4-B1	25 July 2007	BT	43°00.4′N, 139°57.2′E	43°00.5′N, 139°59.4′E	1607–1280	off Iwanai
SO07-C4-B2	25 July 2007	BT	42°53.7′N, 139°59.4′E	42°54.3′N, 140°01.1′E	843–800	off Iwanai
SO10-C4	19–20 July 2010	TR	39°59.2′N, 135°57.8′E	39°59.2′N, 135°57.4′E	1371–1384	slope of Yamato Ridge
SO10-C4-B	19 July 2010	BT	39°59.2′N, 135°57.7′E	39°59.0′N, 135°57.7′E	1377–1377	slope of Yamato Ridge
SO12-C13	26–27 July 2012	TR	39°20.0′N, 135°01.9′E	39°20.0′N, 135°02.2′E	302–304	Yamato Ridge
SO12-C13-B	26 July 2012	BT	39°20.5′N, 135°02.8′E	39°20.0′N, 135°03.2′E	306–308	Yamato Ridge
SO12-C15	23–24 July 2012	TR	42°56.2′N, 139°59.1′E	42°56.6′N, 139°58.2′E	1140–1332	off Iwanai
SO12-C15-B2	23 July 2012	BT	42°58.2′N, 139°58.7′E	42°58.5′N, 139°58.0′E	1376–1432	off Iwanai
SO13-C4	21–22 July 2013	TR	42°56.1′N, 139°59.0′E	42°57.3′N, 139°58.8′E	1132–1225	off Iwanai
SO13-C4-B	21 July 2013	BT	42°57.6′N, 139°59.7′E	42°58.6′N, 139°59.9′E	1280–1334	off Iwanai
SO13-C5	27–28 July 2013	TR	45°05.0′N, 140°30.0′E	45°05.2′N, 140°30.3′E	326–328	off Rebun
SO13-C5-B	27 July 2013	BT	45°05.4′N, 140°30.7′E	45°05.1′N, 140°31.3′E	331–332	off Rebun

Taxonomic Account

Suborder Dendrobranchiata
Family Penaeidae
Metapenaeopsis mogiensis mogiensis (Rathbun, 1902)
[Japanese name: Mogi-ebi]
(Fig. 1A)

Material examined. KT-11-9-N2, 1 ♀ (cl 8.1 mm), NSMT-Cr 22398.

Distribution. Crosnier (1991) divided *Metapenaeopsis mogiensis* into three subspecies, of which the nominotypical form is restricted to Japanese waters, occurring in waters around Kyushu, Sea of Japan (Ishikawa and Shimane Prefecture), Pacific side (Suruga Bay and Sagami Bay); sublittoral to 200 m (Hayashi, 1992b; this study).

Suborder Pleocyemata
Infraorder Caridea
Family Crangonidae
Argis hozawai (Yokoya, 1939)
[Japanese name: Hime-kuro-zako-ebi]

Argis hozawai – Komai and Amaoka, 1992: 25, figs. 1–4; Motoh and Toyoda, 2005: 35.

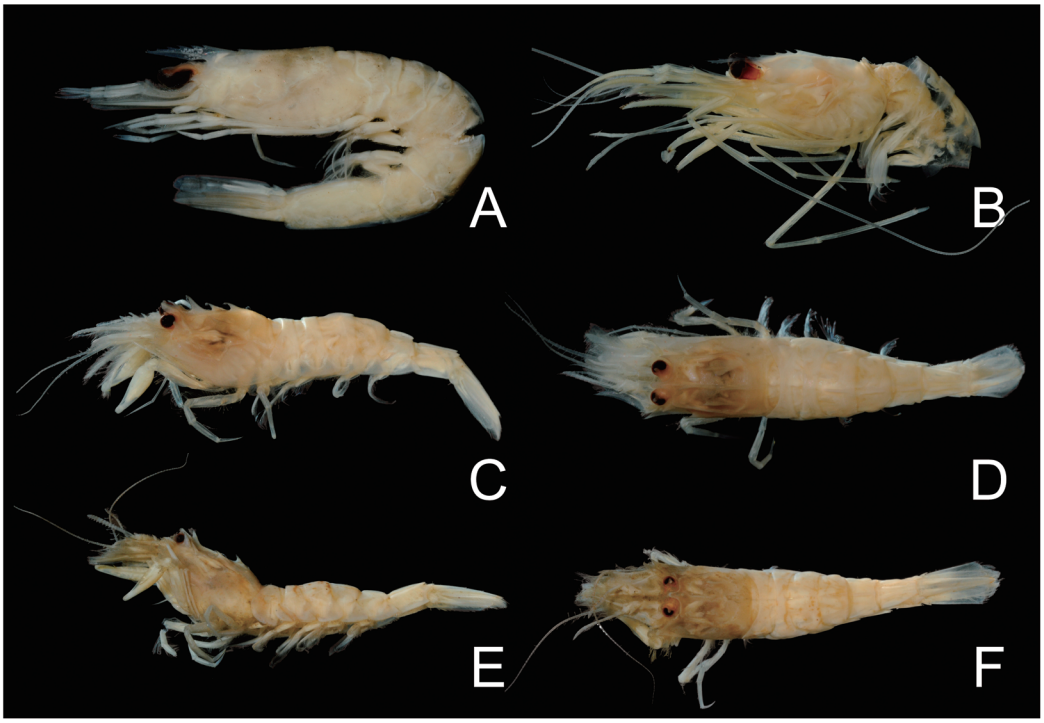

Fig. 1. A. *Metapenaeopsis mogiensis mogiensis* (Rathbun, 1902), female (cl 8.1 mm), NSMT-Cr 22398, KT-11-9-N2, off Noto Peninsula; B, *Lebbeus polyacanthus* Komai, Hayashi and Kohtsuka, 2004, male (cl 9.3 mm), NSMT-Cr 22587, SO07-C1-B, Yamato Ridge; C–D, *Metacrangon obliqua* Komai, 2012, male (cl 5.9 mm), NSMT-Cr 22492, KT-11-9-E1, off Esashi, Hokkaido; E–F, *Metacrangon robusta* (Kobjakova, 1935), male (cl 7.8 mm), NSMT-Cr 22493, KT-11-9-M2, Musashi Bank.

Material examined. KT-10-8-R1, 6♀♀ (cl 9.6–13.9 mm), NSMT-Cr 22399; KT-11-9-N2, 1♂ (cl 9.7 mm), 2♀♀ (cl 15.4, 19.6 mm), 1♀ with bopyrids in branchial chamber (cl 15.1 mm), NSMT-Cr 22400.

Distribution. Restricted to East Asian waters, including Sea of Okhotsk, Sea of Japan southward to Korea, Hokkaido to off Onahama, Fukushima Prefecture; 10–310 m (Komai and Amaoka, 1992; Komai and Komatsu, 2009).

Argis lar (Owen, 1839)
[Japanese name: Kuro-zako-ebi]

Argis lar – Suzuki, 1979: 292, fig. 34; Doi, 1989: 53; Motoh and Toyoda, 2005: 34.

Material examined. TS09-T102, 1ovig. ♀ (cl 29.1 mm), 4♀♀ (cl 26.0–32.2 mm), NSMT-Cr 22401; TS09-T107, 1♀ (cl 13.2 mm), 3♀♀ with bopyrids in branchial chamber (cl 20.2–22.0 mm), NSMT-Cr 22402; KT-10-8-T1, 4♀♀ (cl 10.3–25.8 mm), NSMT-Cr 22403; KT-11-9-E1, 2♂♂ (cl 9.7, 10.5 mm), 4♀♀ (cl 13.0–23.2 mm), NSMT-Cr 22404; KT-11-9-K2, 6♀♀ (cl 17.7–27.3 mm), NSMT-Cr 22405; KT-11-9-M2, 5♂♂ (cl 7.0–8.9 mm), 25♀♀ (cl 8.0–25.3 mm), 1juv. (cl 9.0 mm), NSMT-Cr 22406; KT-11-9-T2, 1ovig. ♀ (cl 25.8 mm), 4♀♀ (cl 23.9–32.4 mm), NSMT-Cr 22407.

Remarks. Although Doi (1989) recorded this species from Toyama Bay at the depths of 306–1345 m, it is highly likely that he confused *Argis lar* with *A. toyamaensis* (Yokoya, 1933). The available data and the present material suggest that *A. lar* does not extend to depths greater than 350 m.

Distribution. Northern North Pacific, including Sea of Japan, northern Japan, Sea of Okhotsk, Bering Sea to Strait of Georgia, Chukchi Sea; 10–350 m (Butler, 1980; Komai and Komatsu, 2009). In Japanese waters, occurring in waters around Hokkaido, Sea of Japan southward to Shimane Prefecture, Pacific side southward to Miyagi Prefecture (Kim, 2000; Komai and Komatsu, 2009).

Argis toyamaensis (Yokoya, 1933)
[Japanese name: Toge-zako-ebi]

Nectocrangon toyamaensis Yokoya, 1933: 39, fig. 20.
Argis dentata – Ito, 1978: 138.
Nectocrangon dentata – Suzuki, 1979: 293, fig. 34–35; Doi, 1989: 53. [Not *Argis dentata* (Rathbun, 1902)]
Argis toyamaensis – Komai, 1997: 144, figs. 8–11, 16–20; Hayashi, 2010: 479, figs. 609i–j, 611l–m, 612 m–o.

Material examined. TS09-OW04, 1ovig. ♀ (cl 22.3 mm), 1♀ (cl 35.9 mm), NSMT-Cr 22408; TS09-OW05, 1ovig. ♀ (cl 27.9 mm), 2♀♀ (cl 29.1, 35.9 mm), NSMT-Cr 22409; TS09-OW06, 1ovig. ♀ (cl 27.1 mm), 1♀ (cl 29.5 mm), NSMT-Cr 22410; TS09-OW07, 1ovig. ♀ (cl 25.7 mm), 2♀♀ (cl 32.5, 33.8 mm), NSMT-Cr 22411; TS09-OW08, 1♂ (cl 19.6 mm), 1ovig. ♀ (cl 25.4 mm), 2♀♀ (cl 27.5, 27.6 mm), NSMT-Cr 22412; TS09-OW09, 2♂♂ (cl 22.1, 25.1 mm), 2ovig. ♀♀ (cl 23.0, 27.5 mm), NSMT-Cr 22413; TS09-OW10, 1♂ (cl 20.4 mm), 1ovig. ♀ (cl 21.4 mm), 2♀♀ (cl 22.9, 27.5 mm), NSMT-Cr 22414; TS09-OW11, 1ovig. ♀ (cl 26.0 mm), 2♀♀ (cl 18.0, 25.8 mm), NSMT-Cr 22415; TS09-OW12, 3♀♀ (cl 18.2–24.1 mm), NSMT-Cr 22416; TS09-OW13, 2ovig. ♀♀ (cl 22.5, 25.7 mm), 2♀♀ (cl 17.5, 22.5 mm), NSMT-Cr 22417; TS09-OW15, 1♂ (cl 15.5 mm), 2♀♀ (cl 23.0, 24.3 mm), NSMT-Cr 22418; TS09-OW28, 1ovig. ♀ (cl 27.4 mm), 1♀ (cl 26.8 mm), NSMT-Cr 22419; TS09-OW29, 1ovig. ♀ (cl 27.1 mm), 1♀ (cl

28.1 mm), NSMT-Cr 22420; TS09-OW30, 1ovig. ♀ (cl 33.5 mm), 1 ♀ (cl 29.8 mm), NSMT-Cr 22421; TS09-OW31, 1ovig. ♀ (cl 25.8 mm), 1 ♀ (cl 28.3 mm), NSMT-Cr 22422; TS09-OW32, 1ovig. ♀ (cl 24.0 mm), 3 ♀♀ (cl 23.3–30.6 mm), NSMT-Cr 22423; TS09-OW33, 2ovig. ♀♀ (cl 24.4, 25.6 mm), 2 ♀♀ (cl 24.0, 26.7 mm), NSMT-Cr 22424; TS09-OW34, 1 ♂ (cl 23.2 mm), 2ovig. ♀♀ (cl 23.2, 25.5 mm), 1 ♀ (cl 26.2 mm), NSMT-Cr 22425; TS09-OW35, 1ovig. ♀ (cl 23.7 mm), 3 ♀♀ (cl 14.4–25.3 mm), NSMT-Cr 22426; TS09-OW36, 1ovig. ♀ (cl 24.4 mm), 3 ♀♀ (cl 15.8–21.0 mm), NSMT-Cr 22427; TS09-OW37, 4 ♀♀ (cl 19.6–24.4 mm), NSMT-Cr 22428; TS09-OW38, 2 ♂♂ (cl 21.7, 31.0 mm), 1 ♀ (cl 24.9 mm), NSMT-Cr 22429; TS09-OW39, 1ovig. ♀ (cl 27.7 mm), 2 ♀♀ (cl 29.7, 33.3 mm), NSMT-Cr 22430; TS09-OW40, 1ovig. ♀ (cl 27.3 mm), 1 ♀ (cl 33.9 mm), NSMT-Cr 22431; TS09-OW42, 1ovig. ♀ (cl 24.9 mm), 1 ♀ (cl 28.5 mm), NSMT-Cr 22432; TS09-OW43, 1ovig. ♀ (cl 23.8 mm), 1 ♀ (cl 28.1 mm), NSMT-Cr 22433; TS09-OW44, 1ovig. ♀ (cl 24.5 mm), 1 ♀ (cl 26.5 mm), NSMT-Cr 22434; TS09-OW45, 1ovig. ♀ (cl 25.5 mm), 1 ♀ (cl 26.3 mm), NSMT-Cr 22435; TS09-OW46, 1ovig. ♀ (cl 26.6 mm), 1 ♀ (cl 23.5 mm), NSMT-Cr 22436; TS09-OW47, 1ovig. ♀ (cl 23.2 mm), 1 ♀ (cl 18.2 mm), NSMT-Cr 22437; TS09-T104, 4 ♀♀ (cl 15.1–17.4 mm), NSMT-Cr 22438; TS09-T106, 2 ♀♀ (cl 15.1, 15.7 mm), NSMT-Cr 22439; TS09-T114, 1 ♀ (cl 26.6 mm), NSMT-Cr 22440; TS10-OW11, 3 ♂♂ (cl 13.5–13.9 mm), NSMT-Cr 22441; TS10-OW14, 6 ♂♂ (cl 12.2–14.7 mm), 1 ♀ (cl 21.3 mm), NSMT-Cr 22442; KT-10-8-Es2, 1 ♂ (cl 13.1 mm), 6 ♀♀ (cl 13.5–28.0 mm), NSMT-Cr 22443; KT-10-8-Es3, 1ovig. ♀ (cl 28.3 mm), 5 ♀♀ (cl 12.8–23.9 mm), NSMT-Cr 22444; KT-10-8-R2, 2ovig. ♀♀ (cl 26.0, 27.6 mm), 1 ♀ (cl 19.3 mm), NSMT-Cr 22445; KT-10-8-R3, 3 ♀♀ (cl 15.0–20.7 mm), NSMT-Cr 22446; KT-10-8-R4, 4 ♀♀ (cl 20.4–28.5 mm), NSMT-Cr 22447; KT-10-8-R5, 3 ♀♀ (cl 25.8–27.8 mm), NSMT-Cr 22448; KT-10-8-R6, 3 ♀♀ (cl 19.5–25.1 mm), NSMT-Cr 22449; KT-10-8-T1, 1 ♀ (cl 25.4 mm), NSMT-Cr 22450; KT-10-8-T2, 1 ♂ (cl 14.2 mm), 2ovig. ♀♀ (cl 29.2, 31.3 mm), 3 ♀♀ (cl 25.0–29.6 mm), NSMT-Cr 22451; KT-10-8-T3, 1ovig. ♀ (cl 26.9 mm), 4 ♀♀ (cl 21.6–27.7 mm), NSMT-Cr 22452; KT-10-8-T4, 4 ♀♀ (cl 16.7–23.9 mm), NSMT-Cr 22453; KT-11-8-R3, 2 ♀♀ (cl 20.3, 22.3 mm), NSMT-Cr 22454; KT-11-9-E3, 2ovig. ♀♀ (cl 27.5, 29.9 mm), 3 ♀♀ (cl 26.4–28.2 mm), NSMT-Cr 22455; KT-11-9-E4, 2ovig. ♀♀ (cl 25.8, 32.8 mm), 3 ♀♀ (cl 19.0–25.2 mm), NSMT-Cr 22456; KT-11-9-K3, 2ovig. ♀♀ (cl 24.6, 32.3 mm), 3 ♀♀ (cl 18.4–22.3 mm), NSMT-Cr 22457; KT-11-9-K4, 5 ♀♀ (cl 19.0–34.4 mm), NSMT-Cr 22458; KT-11-9-K5, 3 ♂♂ (cl 12.3–15.0 mm), 2ovig. ♀♀ (cl 23.9, 25.3 mm), 6 ♀♀ (cl 12.1–25.1 mm), NSMT-Cr 22459; KT-11-9-M3, 2ovig. ♀♀ (cl 28.4, 29.0 mm), 3 ♀♀ (cl 21.2–31.6 mm), NSMT-Cr 22460; KT-11-9-M4, 1ovig. ♀ (cl 31.0 mm), 3 ♀♀ (cl 21.7–32.3 mm), NSMT-Cr 22461; KT-11-9-M5, 1 ♂ (cl 13.5 mm), 2ovig. ♀♀ (cl 25.0, 28.0 mm), 2 ♀♀ (cl 19.8, 24.5 mm), NSMT-Cr 22462; KT-11-9-M6, 1ovig. ♀ (cl 23.1 mm), 5 ♀♀ (cl 18.4–27.8 mm), NSMT-Cr 22463; KT-11-9-N3, 1ovig. ♀ (cl 26.4 mm), 4 ♀♀ (cl 18.8–31.6 mm), NSMT-Cr 22464; KT-11-9-N4, 6 ♂♂ (cl 10.7–15.3 mm), 2ovig. ♀♀ (cl 26.7, 31.9 mm), 8 ♀♀ (cl 16.3–33.4 mm), 1juv. (cl 11.6 mm), NSMT-Cr 22465; KT-11-9-T3, 1ovig. ♀ (cl 27.8 mm), 4 ♀♀ (cl 18.3–31.9 mm), NSMT-Cr 22466; KT-11-9-T4, 5 ♀♀ (cl 16.2–27.7 mm), NSMT-Cr 22467; KT-11-9-T5, 3ovig. ♀♀ (cl 26.4–32.2 mm), 2 ♀♀ (cl 25.9, 27.9 mm), NSMT-Cr 22468; KT-11-9-T6, 1ovig. ♀ (cl 22.3 mm), 9 ♀♀ (cl 11.0–24.8 mm), NSMT-Cr 22469; SO07-C2, 1 ♀ (cl 14.0 mm), NSMT-Cr 22470; SO07-C2–B, 1juv. (cl 6.8 mm), NSMT-Cr 22471; SO07-C4, 2 ♂♂ (cl 12.1, 12.6 mm), 6 ♀♀ (cl 8.0–15.9 mm), 1juv. (cl 6.3 mm), NSMT-Cr 22472; SO07-C4-B1, 1 ♂ (cl 12.1 mm), 3 ♀♀ (cl 10.1–23.6 mm), NSMT-Cr 22473; SO07-C4-B2, 1ovig. ♀ (cl 29.7 mm), 3 ♀♀ (cl 14.1–28.2 mm), NSMT-Cr 22474; SO10-C4-B, 1 ♀ (cl 22.4 mm), NSMT-Cr 22475; SO10-C4, 1 ♀ (cl 22.2 mm), NSMT-Cr 22476; SO12-C15, 1 ♀ (cl 26.4 mm), 2juvs. (cl 11.3, 12.1 mm), NSMT-Cr 22477; SO13-C4, 2 ♀♀ (cl 15.6, 17.6 mm), NSMT-Cr

22478; SO13-C4-B, 1juv. (cl 4.5 mm), NSMT-Cr 22479; SO13-C5-B, 3ovig. ♀♀ (cl 25.4–27.7 mm), 1 ♀ (cl 32.0 mm), 1juv. (cl 9.6 mm), NSMT-Cr 22480.

Size. Largest male cl 31.0 mm, largest female 35.9 mm, ovigerous females cl 21.4–32.8 mm.

Distribution. Probably endemic to the Sea of Japan from off Hokkaido Prefecture southward to Shimane Prefecture, Russian Far East, Korea; 150–2090 m (Kobjakova, 1937; Komai, 1997; Sokolov, 2001; Kim and Choi, 2006; Hayashi, 2010), most abundant at depths of 450–850 m (Ito, 1978)

Crangon dalli Rathbun, 1902
[Japanese name: Mizo-ebijako]

Material examined. TS09-OW01, 1ovig. ♀ (cl 19.2 mm), 3 ♀♀ (cl 13.2–13.3 mm), 1 ♀ with bopyrid parasite in right branchial chamber (cl 11.4 mm), NSMT-Cr 22481; TS09-T002, 1 ♀ (cl 16.5 mm), NSMT-Cr 22482; TS09-T003, 1 ♂ (cl 17.7 mm), NSMT-Cr 22483; TS09-T008, 1 ♂ (cl 15.4 mm), 3 ♀♀ (cl 15.4–18.6 mm), NSMT-Cr 22484; TS09-T104, 1 ♀ (cl 13.5 mm), NSMT-Cr 22485; TS09-T107, 1 ♂ (cl 13.5 mm), 4 ♀♀ (cl 12.0–13.0 mm), NSMT-Cr 22486; KT-11-9-T2, 2 ♂♂ (cl 9.6, 11.1 mm), 8 ♀♀ (cl 9.4–11.9 mm), NSMT-Cr 22487; KT-11-9-T2, 5 ♀♀ (cl 12.1–15.4 mm), NSMT-Cr 22488.

Distribution. North Pacific, Puget Sound to Sea of Japan; Bering Sea; Chukchi Sea; subtidal to 630 m (Butler, 1980; Hayashi and Kim, 1999). In Japanese waters, occurring in Hokkaido, northeastern Honshu southward to Fukushima Prefecture, and Sea of Japan southward to Shimane Prefecture (Hayashi and Kim, 1999; this study).

Mesocrangon intermedia (Stimpson, 1860)
[Japanese name: Naka-ebijyako]

Mesocrangon intermedia – Komai,1994b: 97.

Material examined. KT-10-8-R1, 4 ♀♀ (cl 6.8–9.1 mm), 23juvs. (cl 3.8–5.5 mm), NSMT-Cr 22489; KT-11-9-E1, 2 ♀♀ (cl 8.4, 9.9 mm), NSMT-Cr 22490; KT-11-9-M2, 5 ♂♂ (cl 5.0–7.4 mm), 27 ♀♀ (cl 4.3–8.6 mm), 2juvs. (cl 3.6–4.0 mm), NSMT-Cr 22491.

Distribution. Bering Sea, Okhotsk Sea, Japan (Hokkaido and Sagami Bay); 18–400 m (Fujiya *et al.*, 2013).

Metacrangon obliqua Komai, 2012
(Figs. 1C–D, 2)

Metacrangon obliqua Komai, 2012: 47, figs. 24–25, 41.

Material examined. KT-11-9-E1, 5 ♂♂ (cl 5.0–7.4 mm), 1ovig. ♀ (cl 9.8 mm), 8 ♀♀ (cl 5.0–9.9 mm), 2juvs. (cl 3.6, 4.4 mm), NSMT-Cr 22492.

Notes on males. Rostrum (Fig. 2A) slightly ascending; anterior and posterior middorsal teeth more produced than in females; outer flagellum of antennule (Fig. 2B) overleaching distal margin of lamella of antennal scale by 0.6 length, consisting of 11 (n=2) or 14 (n=3) articles. Appendix masculina typical of genus, as illustrated (Fig. 2C).

Remarks. This is the first record of male specimen of this species. Females agree well with the original description by Komai (2012).

Distribution. Known only from southwestern off Hokkaido, Sea of Japan; 222–300 m (Komai, 2012; this study).

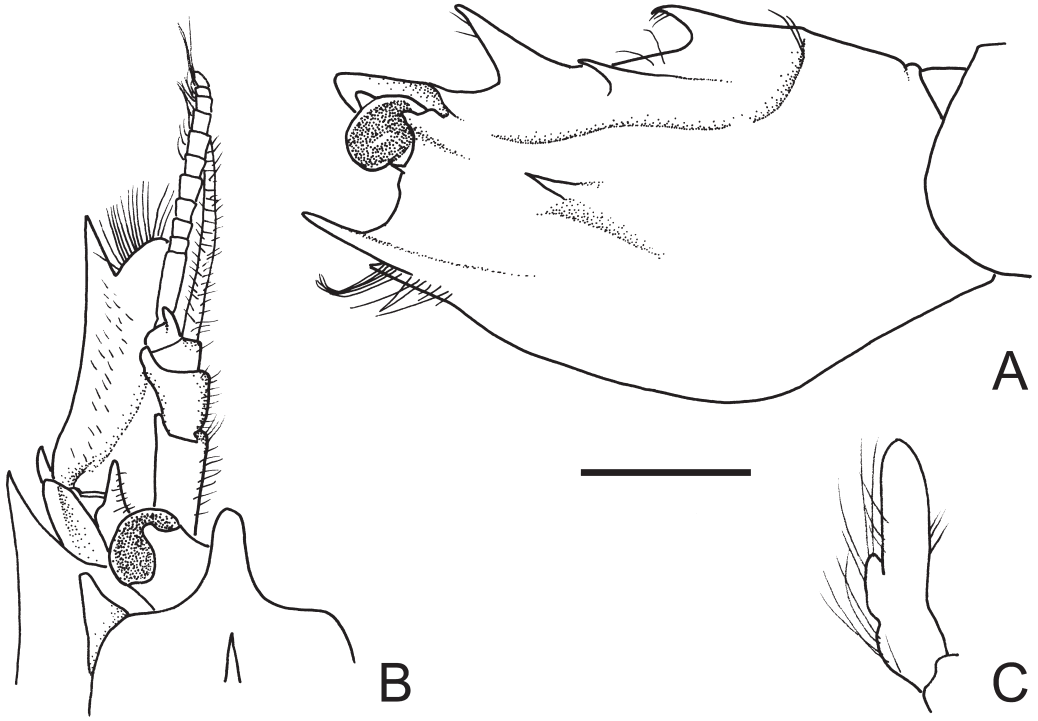

Fig. 2. *Metacrangon obliqua* Komai, 2012, male (cl 5.9 mm), NSMT-Cr 22492, KT-11-9-E1, off Esashi, Hokkaido. A, carapace, lateral view (setae omitted); B, anterior part of carapace and cephalic appendages, left side, dorsal view (setae omitted); C, endopod and appendix masculina of left second pleopod, posterior view. Scale: 2 mm for A, B; 1 mm for C.

Metacrangon robusta (Kobjakova, 1935)
(Figs. 1E–F, 3)

Material examined. KT-11-9-M2, 1♂ (cl 7.8 mm), 3ovig. ♀♀ (cl 10.5–12.1 mm), 15♀♀ (cl 6.7–11.5 mm), NSMT-Cr 22493.

Notes on male. Anterior and posterior middorsal teeth (Fig. 3A) more produced than in females; branchiostegal tooth slightly directed outward in dorsal view; outer flagellum of antennule (Fig. 3B) overreaching distal margin of lamella of antennal scale by 0.7 length, consisting of 16 articles.

Remarks. The present specimens agree well with the redescription by Komai (2012) based on the female specimens collected from the Sea of Okhotsk except for some morphological features of male. This is the first record of the species from off the Japanese coast of the Sea of Japan.

Distribution. Sea of Japan (Peter the Great Bay and Hokkaido) and Sea of Okhotsk; 50–1380 m (Komai, 2012; this study).

Neocrangon communis (Rathbun, 1899)
[Japanese name: Futa-toge-ebijyako]

Neocrangon communis – Yokoya, 1933: 34; Suzuki, 1979: 294.

Material examined. TS09-T003, 1♀ (cl 14.0 mm), NSMT-Cr 22494; TS09-T056, 1♀ (cl

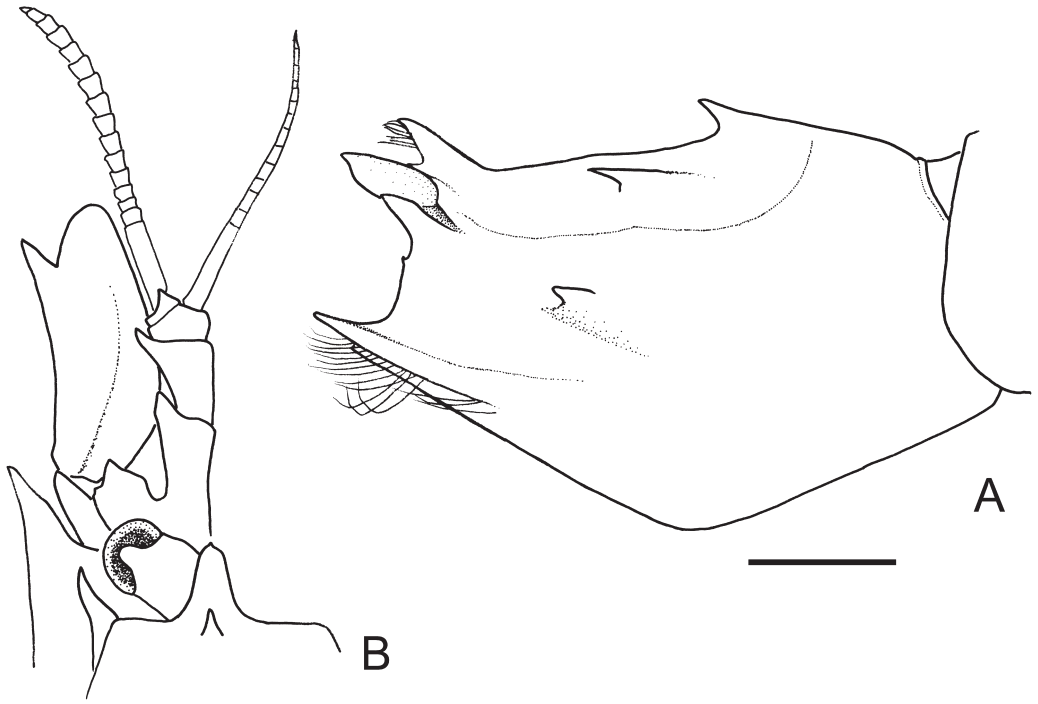

Fig. 3. *Metacrangon robusta* (Kobjakova, 1935), male (cl 7.8 mm), NSMT-Cr 22493, KT-11-9-M2, Musashi Bank. A, carapace, lateral view (setae omitted); B, anterior part of carapace and cephalic appendages, left side, dorsal view (setae omitted). Scale: 2 mm.

13.8 mm), NSMT-Cr 22495; TS09-T102, 2 ♀♀ (cl 14.9, 15.6 mm), NSMT-Cr 22496; TS09-T104, 8 ♀♀ (cl 13.4–17.0 mm), NSMT-Cr 22497; TS09-T106, 1ovig. ♀ (cl 16.8 mm), NSMT-Cr 22498; KT-10-8-Es1, 1ovig. ♀ (cl 15.6 mm), 1 ♀ (cl 17.0 mm), NSMT-Cr 22499; KT-10-8-R1, 2 ♂♂ (cl 7.1, 7.9 mm), 4 ♀♀ (cl 7.5–12.9 mm), 34juvs. (cl 4.1–6.6 mm), NSMT-Cr 22500; KT-10-8-T1, 3 ♀♀ (cl 9.2–14.1 mm), 1juv. (cl 6.8 mm), NSMT-Cr 22501; KT-11-9-M2, 1 ♂ (cl 10.2 mm), 1ovig. ♀ (cl 12.8 mm), 3 ♀♀ (cl 8.1–10.5 mm), NSMT-Cr 22502; KT-11-9-M4, 1 ♂ (cl 10.8 mm), NSMT-Cr 22503; KT-11-9-N3, 2 ♂♂ (cl 12.3, 14.4 mm), 1ovig. ♀ (cl 15.0 mm), NSMT-Cr 22504; KT-11-9-N4, 1 ♀ (cl 12.2 mm), NSMT-Cr 22505; KT-11-9-T3, 2ovig. ♀♀ (cl 15.1, 15.7 mm), 3 ♀♀ (cl 12.9–15.8 mm), NSMT-Cr 22506; SO13-C5-B, 2 ♂♂ (cl 8.8, 11.0 mm), 1ovig. ♀ (cl 14.5 mm), NSMT-Cr 22507.

Remarks. Komai and Komatsu (2009) remarked that the Japanese specimens differed from the American specimens in the relatively large cornea of the eye and the proportionally longer antennal scale. Molecular comparison is needed to clarify if the two separate populations are distinct.

Distribution. North Pacific, San Diego to Sea of Japan; Bering Sea; Chukchi Sea; 16–1537 m (Butler, 1980). In Japanese waters, occurring in Hokkaido, northeastern Honshu, and Sea of Japan, ranging from Hokkaido southward to Shimane Prefecture (Motoh, 2008; Komai and Komatsu, 2009; this study).

Neocrangon sagamiensis (Balss, 1913)
[Japanese name: Soko-ebijyako]

Material examined. KT-11-9-N3, 1 ♀ (cl 11.3 mm), NSMT-Cr 22508.

Distribution. Known from the Pacific coast of Japan from off Miyako, Iwate Prefecture to East China Sea, Sea of Japan (Ishikawa Prefecture, Kyoto Prefecture and southern Korea); 150–400 m (Uchino *et al.*, 1982; Komai and Komatsu, 2009; this study).

Paracrangon echinata Dana, 1852
[Japanese name: Kajiwara-ebi]

Paracrangon echinata – Komai and Kim, 2004: 516, figs. 2–4.

Material examined. TS09-T107, 1 ♀ (cl 13.9 mm), NSMT-Cr 22509.

Distribution. North Pacific, Sea of Japan to La Jolla, California, 18–250 m (Butler, 1980; Komai and Kim, 2004). In Japanese waters, occurring in Hokkaido, northeastern Honshu southward to Miyagi Prefecture, and Sea of Japan southward to Shimane Prefecture (Sato and Kato, 1996; this study).

Paracrangon sp.
(Fig. 4A, B)

Material examined. KT-11-9-K2, 1 ♀ (cl 10.7 mm), NSMT-Cr 22510.

Remarks. Among the seven known species of *Paracrangon*, the present specimen resembles *P. echinata* Dana, 1851 and *P. abei* Kubo, 1937 in the faintly branched subbranchial carina of the carapace, having a pair of submedian teeth on anterior part of the telson, the carpi of the fourth and fifth pereopods being distinctly shorter than the propodi, but can be distinguished from both species by the very short rostrum with only 1 ventral tooth (vs. 1 dorsal and 2 ventral teeth), having 1 blunt tooth on the lateral face of the sixth abdominal somite (vs. 2 sharp teeth), and 2 small spines on the cardiac region (vs. without spine or tubercle). It may represent an undescribed species, however, but a final decision is postponed until additional specimens are collected.

Rhynocrangon sharpi (Ortmann, 1896)
[Japanese name: Tsuno-ebijyako]
(Fig. 4C, D)

Rhynocrangon sharpi – Kim and Natsukari, 2000: 38, figs. 2–4.

Material examined. KT-10-8-R1, 1juv. (cl 4.0 mm), NSMT-Cr 22511; KT-11-9-E1, 1 ♀ (cl 10.7 mm), NSMT-Cr 22512.

Distribution. Bering Sea, Alutian Islands, Alaska, northern Kurile Islands, central and northern coast of Sea of Japan; 30–270 m (Kobjakova, 1937; Kim and Natsukari, 2000).

Family Hippolytidae
Eualus biunguis (Rathbun, 1902)
[Japanese name: Hasami-mo-ebi]

Spirontocaris biunguis – Yokoya, 1933: 27, fig. 9.
Eualus biunguis – Suzuki, 1979: 290; Doi, 1989: 54; Motoh and Yamaguchi, 2009: 215.

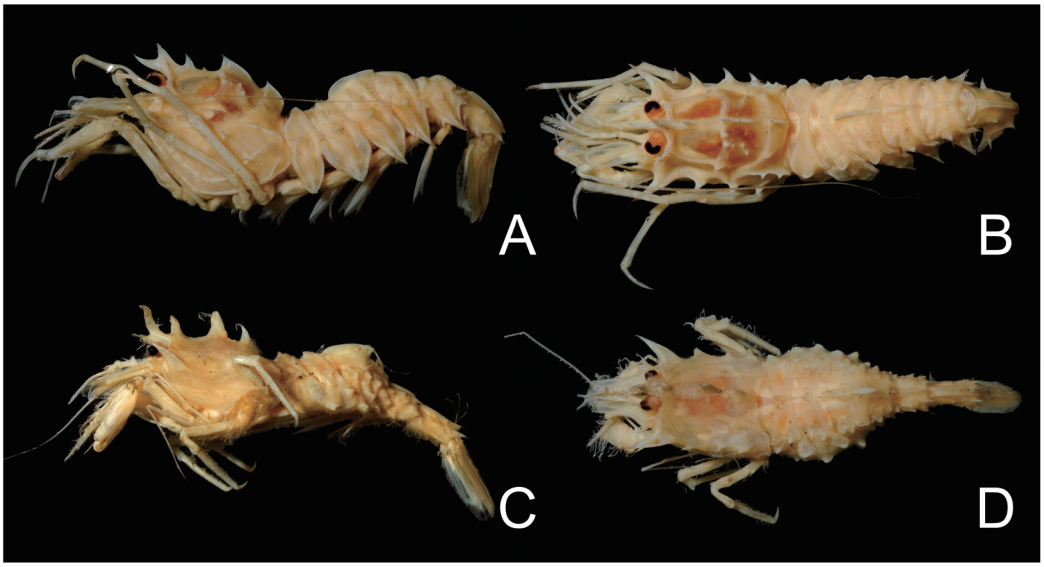

Fig. 4. A–B, *Paracrangon* sp., female (cl 10.7 mm), NSMT-Cr 22510, KT-11-9-K2, off Kasumi, Hyogo Prefecture; C–D, *Rhynocrangon sharpi* (Ortmann, 1896), female (cl 10.7 mm), NSMT-Cr 22512, KT-11-9-E1, off Esashi, Hokkaido.

Material examined. TS09-OW04, 1ovig. ♀ (cl 19.8 mm), 1 ♀ infected with bopyrids (cl 16.8 mm), NSMT-Cr 22513; TS09-OW05, 2ovig. ♀♀ (cl 19.5, 20.8 mm), 2 ♀♀ infected with bopyrids (cl 15.6, 18.9 mm), NSMT-Cr 22514; TS09-OW06, 1ovig. ♀ (cl 18.2 mm), 1 ♀ (cl 16.3 mm), NSMT-Cr 22515; TS09-OW07, 2ovig. ♀♀ (cl 19.5, 20.3 mm), 1 ♀ (cl 18.0 mm), NSMT-Cr 22516; TS09-OW08, 1 ♂ (cl 16.1 mm), 1ovig. ♀ (cl 18.6 mm), 1 ♀ (cl 21.0 mm), 1 ♀ infected with bopyrids (cl 18.9 mm), NSMT-Cr 22517; TS09-OW09, 2ovig. ♀♀ (cl 18.1, 20.4 mm), 2 ♀♀ (cl 14.9, 16.4 mm), NSMT-Cr 22518; TS09-OW10, 2ovig. ♀♀ (cl 15.0, 15.0 mm), 3 ♀♀ (cl 10.1–16.5 mm), NSMT-Cr 22519; TS09-OW11, 2 ♀♀ (cl 9.5, 15.5 mm), 2 ♀♀ infected with bopyrids (cl 16.1, 17.2 mm), NSMT-Cr 22520; TS09-OW12, 2 ♀♀ (cl 14.3, 17.2 mm), 1 ♀ infected with bopyrids (cl 18.0 mm), NSMT-Cr 22521; TS09-OW28, 2ovig. ♀♀ (cl 20.0, 20.5 mm), 1 ♀ (cl 16.4 mm), 2 ♀♀ infected with bopyrids (cl 18.6, 20.2 mm), NSMT-Cr 22522; TS09-OW29, 1ovig. ♀ (cl 19.6 mm), 1 ♀ (cl 17.9 mm), 1 ♀ infected with bopyrids (cl 20.2 mm), NSMT-Cr 22523; TS09-OW30, 2ovig. ♀♀ (cl 19.8, 20.4 mm), 2 ♀♀ infected with bopyrids (cl 18.6, 19.0 mm), NSMT-Cr 22524; TS09-OW31, 1ovig. ♀ (cl 19.3 mm), 1 ♀ infected with bopyrids (cl 19.8 mm), NSMT-Cr 22525; TS09-OW32, 1 ♂ (cl 16.6 mm), 2ovig. ♀♀ (cl 17.7, 18.4 mm), 1 ♀ infected with bopyrids (cl 17.6 mm), NSMT-Cr 22526; TS09-OW33, 1ovig. ♀ (cl 18.1 mm), 2 ♀♀ (cl 17.2, 18.9 mm), 1 ♀ infected with bopyrids (cl 17.9 mm), NSMT-Cr 22527; TS09-OW34, 3 ♀♀ (cl 14.1–16.6 mm), NSMT-Cr 22528; TS09-OW35, 1 ♀ (cl 16.9 mm), 2 ♀♀ infected with bopyrids (cl 17.3, 17.8 mm), NSMT-Cr 22529; TS09-OW38, 2ovig. ♀♀ (cl 18.2, 19.4 mm), 1 ♀ infected with bopyrids (cl 18.2 mm), NSMT-Cr 22530; TS09-OW39, 1ovig. ♀ (cl 19.4 mm), 1 ♀ (cl 19.7 mm), NSMT-Cr 22531; TS09-OW40, 1ovig. ♀ (cl 15.5 mm), 1 ♀ (cl 16.0 mm), NSMT-Cr 22532; TS09-OW42, 1ovig. ♀ (cl 17.4 mm), 1 ♀ (cl 15.7 mm), NSMT-Cr 22533; TS09-OW43, 1ovig. ♀ (cl 20.3 mm), 1 ♀ infected with bopyrids (cl 16.1 mm), NSMT-Cr 22534; TS09-OW44, 1 ♀ infected with bopyrids (cl 15.5 mm), NSMT-Cr 22535; TS09-OW45, 2 ♀♀ (cl 14.9, 15.0 mm), NSMT-Cr 22536; TS09-T096, 1ovig. ♀ (cl 14.3 mm), NSMT-Cr 22537; TS09-T114, 2 ♀♀ infected with bopyrids (cl 18.4, 19.9 mm), NSMT-Cr 22538; TS10-OW07,

3ovig. ♀♀ (cl 19.3–19.4 mm), NSMT-Cr 22539; TS10-OW10, 2♂♂ (cl 14.7, 17.3 mm), 2♀♀ (cl 12.6, 13.8 mm), NSMT-Cr 22540; TS10-OW11, 2♀♀ (cl 12.7, 13.8 mm), 2♀♀ infected with bopyrids (cl 12.8, 14.9 mm), NSMT-Cr 22541; KT-10-8-Es2, 2ovig. ♀♀ (cl 16.1, 18.4 mm), 2♀♀ (cl 19.4, 20.3 mm), 1♀ infected with bopyrids (cl 17.5 mm), NSMT-Cr 22542; KT-10-8-Es3, 4♂♂ (cl 15.1–16.9 mm), 3ovig. ♀♀ (cl 17.0–18.5 mm), 4♀♀ (cl 15.2–21.0 mm), 2♀♀ infected with bopyrids (cl 16.9, 16.9 mm), NSMT-Cr 22543; KT-10-8-R3, 2ovig. ♀♀ (cl 17.5, 17.5 mm), 4♀♀ (cl 13.9–16.4 mm), NSMT-Cr 22544; KT-10-8-R4, 2♂♂ (cl 15.1, 15.3 mm), 4ovig. ♀♀ (cl 18.0–19.7 mm), 1♀ (cl 12.9 mm), 1♀ infected with bopyrids (cl 19.5 mm), NSMT-Cr 22545; KT-10-8-R5, 3ovig. ♀♀ (cl 19.3–20.4 mm), 2♀♀ (cl 16.9–18.2 mm), NSMT-Cr 22546; KT-10-8-T2, 1♀ (cl 14.5 mm), 1♀ infected with bopyrids (cl 14.5 mm), NSMT-Cr 22547; KT-10-8-T3, 1♂ (cl 14.0 mm), 3ovig. ♀♀ (cl 15.4–19.9 mm), 8♀♀ (cl 14.2–17.1 mm), 1♀ infected with bopyrids (cl 17.9 mm), NSMT-Cr 22548; KT-11-8-R3, 4♀♀ (cl 14.9–19.9 mm), NSMT-Cr 22549; KT-11-9-E3, 5♀♀ (cl 14.6–19.7 mm), 3♀♀ infected with bopyrids (cl 14.3–17.6 mm), NSMT-Cr 22550; KT-11-9-E4, 1♂ (cl 16.6 mm), 2ovig. ♀♀ (cl 20.2, 21.2 mm), 2♀♀ (cl 18.9, 19.3 mm), 1juv. (cl 7.9 mm), NSMT-Cr 22551; KT-11-9-K4, 3ovig. ♀♀ (cl 18.3–21.1 mm), 2♀♀ infected with bopyrids (cl 16.3, 17.9 mm), NSMT-Cr 22552; KT-11-9-K5, 3ovig. ♀♀ (cl 17.1–18.5 mm), 2♀♀ (cl 16.8, 17.1 mm), 1♀ infected with bopyrids (cl 18.8 mm), NSMT-Cr 22553; KT-11-9-M4, 1♀ (cl 16.9 mm), 3♀♀ infected with bopyrids (cl 14.2–16.0 mm), 1juv. (cl 6.7 mm), NSMT-Cr 22554; KT-11-9-M5, 1♂ (cl 14.6 mm), 5ovig. ♀♀ (cl 15.9–19.1 mm), 4♀♀ (cl 13.5–18.6 mm), NSMT-Cr 22555; KT-11-9-N3, 1♀ (cl 11.3 mm), NSMT-Cr 22556; KT-11-9-N4, 2♂♂ (cl 15.4, 15.9 mm), 5ovig. ♀♀ (cl 17.8–20.1 mm), 5♀♀ (cl 13.5–18.5 mm), 1♀ infected with bopyrids (cl 17.7 mm), NSMT-Cr 22557; KT-11-9-T4, 2♀♀ infected with bopyrids (damaged), NSMT-Cr 22558; KT-11-9-T5, 3ovig. ♀♀ (cl 19.0–21.1 mm), 2♀♀ (cl 18.7, 19.4 mm), NSMT-Cr 22559; KT-11-9-T6, 2♀♀ (cl 7.6, 12.2 mm), 7juvs. (cl 4.2–5.3 mm), NSMT-Cr 22560; SO07-C4, 7♂♂ (cl 8.8–15.3 mm), 13♀♀ (cl 9.8–14.2 mm), 2♀♀ infected with bopyrids (cl 11.1, 14.0 mm), NSMT-Cr 22561; SO07-C4-B1, 3ovig. ♀♀ (cl 18.1–19.0 mm), 2♀♀ (cl 13.7, 16.6 mm), NSMT-Cr 22562; SO12-C15-B2, 1♀ (cl 13.5 mm), NSMT-Cr 22563; SO12-C15, 2♀♀ (cl 13.6, 17.6 mm), NSMT-Cr 22564; SO13-C4, 1ovig. ♀ (cl 16.0 mm), 2♀♀ (cl 14.2, 16.4 mm), NSMT-Cr 22565; SO13-C4-B, 2ovig. ♀♀ (cl 13.7, 17.2 mm), 3♀♀ (cl 11.3–13.8 mm), NSMT-Cr 22566.

Size. Largest male cl 17.3 mm, largest female 21.2 mm, ovigerous females cl 13.7–21.2 mm.

Distribution. North Pacific, ranging from Oregon to Sea of Japan, including Bering Sea; 90–2090 m (Komai and Komatsu, 2009). In Japanese waters, known from Hokkaido, northeastern Honshu, and Sea of Japan, ranging from Hokkaido to Shimane Prefecture (Miyake and Hayashi, 1967; Motoh, 2008; Komai and Komatsu, 2009; this study)

Eualus kuratai Miyake and Hayashi, 1967
[Japanese name: Kurata-mo-ebi]

Material examined. TS09-T034, 3♀♀ (cl 12.8–13.8 mm), NSMT-Cr 22567; TS09-T051, 3♀♀ (cl 12.2–13.4 mm), NSMT-Cr 22568; TS09-T089, 1♀ (cl 12.6 mm), NSMT-Cr 22569; TS09-T100, 1♀ (cl 12.5 mm), NSMT-Cr 22570; KT-11-9-N2, 1♂ (cl 6.7 mm), 4♀♀ (cl 8.2–9.2 mm), NSMT-Cr 22571.

Distribution. Previously known from waters around Hokkaido and northeastern Honshu southward to Iwate Prefecture; 100–467 m (Komai and Komatsu, 2009). The present material extends the geographical range of this species southward to Shimane Prefecture in the Sea of

Japan.

Eualus spathulirostris (Yokoya, 1933)
[Japanese name: Yokoya-tsuno-mo-ebi]

Material examined. TS09-OW01, 1♂ (cl 5.4 mm), NSMT-Cr 22572; KT-11-9-N2, 1♂ (cl 5.8 mm), 1ovig. ♀ (cl 6.3 mm), 8♀♀ (cl 5.3–5.8 mm), NSMT-Cr 22573.

Distribution. East Asia endemic, occurring in Hokkaido, northeastern Honshu southward to Ibaraki Prefecture, Sea of Japan southward to Tsushima Strait, and Yellow Sea (Komai *et al.*, 1992; Komai & Komatsu, 2009; this study).

Lebbeus groenlandicus (Fabricius,1775)
[Japanese name: Ibara-mo-ebi]

Spirontocaris groenlandicus – Yokoya, 1933: 24.
Lebbeus groenlandicus – Suzuki, 1979: 290; Doi, 1989: 54; Hayashi, 1992a: 120.

Material examined. TS09-T006, 1juv. (cl 10.8 mm), NSMT-Cr 22574; TS09-T051, 1♂ (cl 30.5 mm), 1♀ (cl 34.3 mm), NSMT-Cr 22575; TS09-T111, 2♀♀ (cl 27.3, 28.2 mm), NSMT-Cr 22576; KT-11-9-M2, 1♀ (cl 7.8 mm), NSMT-Cr 22577.

Distribution. Greenland southward to Massachusetts Bay, Arctic Canada, Bering Sea to Puget Sound, Sea of Okhotsk, and Sea of Japan; 2–518 m (Hayashi, 1992a). In Japanese waters, known from Hokkaido and Sea of Japan, ranging from Hokkaido to Yamaguchi Prefecture (Hayashi, 1992a).

Lebbeus longipes (Kobjakova, 1936)
[Japanese name: Ashinaga-ibara-mo-ebi]

Lebbeus longipes – Hayashi, 1976: 17; 1992a: 126, fig. 9; Doi, 1989: 54; Motoh and Yamaguchi, 2009: 216, fig. 3G.

Material examined. TS10-T55, 1♂ (cl 14.4 mm), 4ovig. ♀♀ (cl 13.1–15.6 mm), 8♀♀ (cl 13.1–15.0 mm), NSMT-Cr 22578; SO07-C1, 1♂ (cl 12.2 mm), 1ovig. ♀ (cl 16.1 mm), 1♀ (cl 7.7 mm), 1juv. (cl 4.9 mm), NSMT-Cr 22579; SO07-C1-B, 1♂ (cl 9.8 mm), 2♀♀ (cl 5.6, 10.0 mm), 1♀ with bopyrids (cl 11.8 mm), NSMT-Cr 22580; SO12-C13-B, 12♂♂ (cl 8.2–14.9 mm), 1ovig. ♀ (cl 15.8 mm), 14♀♀ (cl 4.8–12.4 mm), NSMT-Cr 22581; SO12-C13-B, 1ovig. ♀ (cl 14.9 mm), NSMT-Cr 22582; SO12-C13-B, 1♂ (cl 12.2 mm), NSMT-Cr 22583; SO12-C13, 1ovig. ♀ (cl 16.6 mm), 18♀♀ (cl 12.3–15.3 mm), NSMT-Cr 22584; SO12-C13, 1ovig. ♀ (cl 15.9 mm), NSMT-Cr 22585.

Distribution. Known only from the Sea of Japan, occurring in Hokkaido southward to Toyama Prefecture in the Japanese coast; 167–1380 m (Hayashi, 1992a).

Lebbeus polyacanthus Komai, Hayashi and Kohtsuka, 2004
[Japanese name: Torafu-ibara-mo-ebi]
(Figs. 1B, 5)

Lebbeus polyacanthus Komai, Hayashi and Kohtsuka, 2004: 109, figs. 4–6; Motoh and Yamaguchi, 2009: 216, fig. 3H.

Material examined. TS10-T55, 4♀♀ (cl 13.4–16.4 mm), NSMT-Cr 22586; SO07-C1-B, 1♂ (cl 9.3 mm; damaged), 1ovig. ♀ (cl 14.5 mm), 1♀ (cl 5.0 mm), 1juv. (cl 3.4 mm), NSMT-Cr 22587; SO12-C13-B, 1♀ (cl 12.0 mm), NSMT-Cr 22588; SO12-C13, 6♀♀ (cl 12.8–16.2 mm),

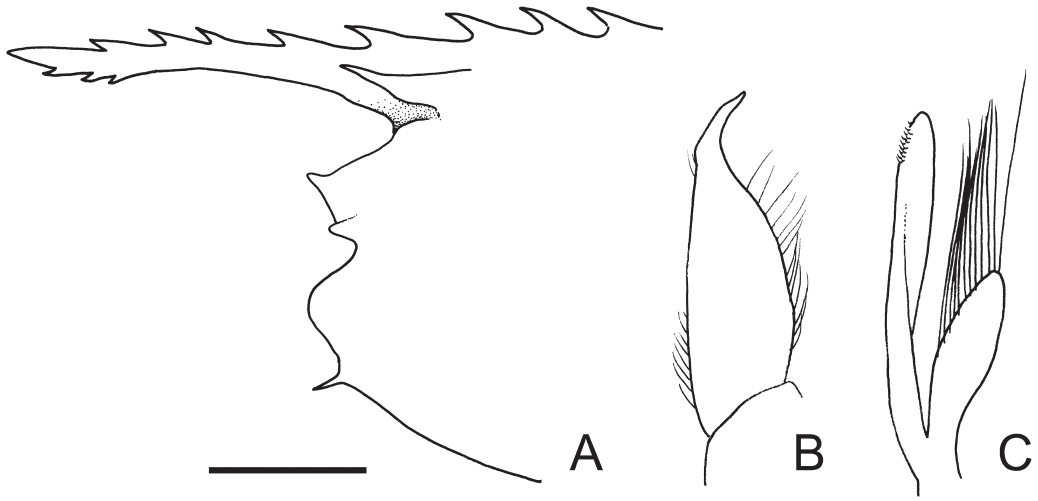

Fig. 5. *Lebbeus polyacanthus* Komai, Hayashi and Kohtsuka, 2004, male (cl 9.3 mm), NSMT-Cr 22587, SO07-C1-B, Yamato Ridge. A, carapace, lateral view; B, endopod of left first pleopod, posterior view; C, endopod and appendix masculina of left second pleopod, posterior view. Scale: 2 mm for A; 1 mm for B; 0.5 mm for C.

NSMT-Cr 22589; SO12-C13, 1♀ (cl 17.4 mm), NSMT-Cr 22590.

Notes on male. Rostrum (Fig. 5A) 0.64 times of carapace length, slightly falling short of distal margin of first article of antennular peduncle, armed with 8 moderately large teeth on dorsal margin including 3 teeth on carapace, armed with 3 small teeth in distal 0.3 of ventral margin, last tooth posterior to level of anteriormost tooth of dorsal series.

Antennular peduncle (Fig. 1B) more elongate than in females, reaching 0.82 of antennal scale. Outer flagellum elongate, flattened, 1.6 times of carapace length, slightly tapered in distal half; inner flagellum also elongate, 1.3 times of carapace length.

Endopod of first pleopod (Fig. 5B) with well-developed appendix interna. Appendix masculina (Fig. 5C) about half length of appendix interna, bearing several long spiniform setae; appendix internra with very short hooked setae on distal 0.15 of mesial margin.

Remarks. This is the first record of male specimen of the species, but the abdomen behind the third somites is broken.

Distribution. Known only from the Sea of Japan, occurring in Yamato Ridge, Toyama Bay, and west coast of Noto Peninsula; 250–400 m (Komai *et al.*, 2004; this study)

Spirontocaris brevidigitata Kobjakova, 1935
[Japanese name: Toge-mo-ebi]

Spirontocaris spinus – Hayashi, 1977: 177, figs. 8–9; Suzuki, 1979: 289. [Not *Spirontocaris spina* (Sowerby, 1805)]
Spirontocaris spina – Motoh and Yamaguchi, 2009: 215. [Not *Spirontocaris spina* (Sowerby, 1805)]

Material examined. TS09-T012, 1♀ (cl 16.8 mm), NSMT-Cr 22591; TS09-T098, 1♀ (cl 17.3 mm), NSMT-Cr 22592; TS09-T099, 1♀ (cl 15.0 mm), NSMT-Cr 22593; TS09-T100, 2ovig. ♀♀ (cl 12.4, 16.7 mm), NSMT-Cr 22594; TS09-T104, 2ovig. ♀♀ (cl 15.6, 16.6 mm), NSMT-Cr 22595; TS09-T105, 4ovig. ♀♀ (cl 15.7–18.9 mm), 3♀♀ (cl 15.1–16.6 mm), NSMT-Cr 22596; TS09-T106, 2ovig. ♀♀ (cl 16.9, 18.2 mm), 3♀♀ (cl 16.2–17.8 mm), NSMT-Cr 22597; KT-10-8-Es1, 1♀ (cl 15.7 mm), NSMT-Cr 22598; KT-10-8-R1, 15♂♂ (cl 3.6–4.6 mm), 36♀♀ (cl 3.6–6.2 mm), NSMT-Cr 22599; KT-10-8-T1, 1♀ (cl 14.8 mm), NSMT-Cr 22600; KT-11-9-T3,

1ovig. ♀ (cl 12.7 mm), NSMT-Cr 22601.

Distribution. Sea of Japan southward to southwestern part of Korea, Sea of Okhotsk, northeastern Honshu; 60–1380 m, but usually 150–400 m (Komai and Komatsu, 2009).

Family Pandalidae

Pandalopsis japonica Balss, 1914

[Japanese name: Morotoge-aka-ebi]

Pandalopsis japonica – Suzuki, 1979: 287; Doi, 1989: 54; Motoh and Yamaguchi, 2009: 218, fig. 4D

Material examined. TS09-T004, 5♀♀ (cl 26.3–28.7 mm), NSMT-Cr 22602; TS09-T006, 1♀ (cl 28.2 mm), NSMT-Cr 22603; TS09-T007, 1♂ (cl 18.0 mm), NSMT-Cr 22604; TS09-T089, 1♀ (cl 30.3 mm), NSMT-Cr 22605; TS09-T103, 1ovig. ♀ (cl 32.0 mm), 7♀♀ (cl 19.4–30.4 mm), NSMT-Cr 22606; KT-11-9-E1, 3♀♀ (cl 22.8–24.8 mm), NSMT-Cr 22607; KT-11-9-K3, 1♂ (cl 16.9 mm), 1♀ (cl 20.9 mm), NSMT-Cr 22608.

Distribution. Sea of Japan from Sakhalin to Oki Islands and Korea, Sea of Okhotsk, and Pacific coast of eastern Hokkaido; 180–530 m (Komai, 1994a; Hayashi, 2008a).

Pandalus eous Makarov, 1935

[Japanese name: Hokkoku-aka-ebi]

Pandalus borealis – Suzuki, 1979: 287; Doi, 1989: 54.
Pandalus eous – Komai, 1999: 1293, figs. 12–13; Motoh and Yamaguchi, 2009: 216, fig. 4B

Material examined. TS09-T096, 1ovig. ♀ (cl 31.9 mm), 1♀ (cl 31.5 mm), NSMT-Cr 22609; TS09-T104, 2♀♀ (cl 20.2, 30.4 mm), NSMT-Cr 22610; TS09-T109, 30♂♂ (cl 12.9–27.1 mm), NSMT-Cr 22611; TS09-T109, 2♂♂ with bopyrids in branchial chamber (cl 22.2, 26.5 mm), NSMT-Cr 22612; TS09-T115, 4♂♂ (cl 20.3–25.2 mm), NSMT-Cr 22613; TS10-T09, 1♀ with bopyrids in branchial chamber (cl 27.7 mm), NSMT-Cr 22614; TS10-T55, 1♂ (cl 25.5 mm), NSMT-Cr 22615; KT-10-8-Es1, 1♂ (cl 21.2 mm), 1ovig. ♀ (cl 24.9 mm), 1♀ (cl 30.6 mm), 1juv. (cl 9.2 mm), NSMT-Cr 22616; KT-10-8-Es2, 2♀♀ (cl 24.5, 25.3 mm), NSMT-Cr 22617; KT-10-8-R1, 3juvs. (cl 9.8–10.1 mm), NSMT-Cr 22618; KT-10-8-R2, 1ovig. ♀ (cl 27.4 mm), 1♀ (cl 28.8 mm), NSMT-Cr 22619; KT-10-8-R3, 3ovig. ♀♀ (cl 27.6–29.8 mm), NSMT-Cr 22620; KT-10-8-T1, 1♂ (cl 19.8 mm), 1juv. (cl 10.2 mm), NSMT-Cr 22621; KT-10-8-T2, 1ovig. ♀ (cl 31.1 mm), 3♀♀ (cl 27.7–31.1 mm), NSMT-Cr 22622; KT-11-9-E1, 2♂♂ (cl 22.7, 24.9 mm), 3ovig. ♀♀ (cl 27.5–28.7 mm), NSMT-Cr 22623; KT-11-9-K4, 3ovig. ♀♀ (cl 28.9–32.4 mm), 2♀♀ (cl 30.4, 30.5 mm), NSMT-Cr 22624; KT-11-9-M2, 3♂♂ (cl 13.1–24.8 mm), 5juvs. (cl 8.0–10.9 mm), NSMT-Cr 22625; KT-11-9-M3, 3♂♂ (cl 22.4–24.8 mm), 2ovig. ♀♀ (cl 25.6, 28.0 mm), NSMT-Cr 22626; KT-11-9-N3, 4♂♂ (cl 19.5–24.3 mm), 1ovig. ♀ (cl 31.4 mm), 1♀ (cl 31.1 mm), 3juvs. (cl 14.8–15.2 mm), NSMT-Cr 22627; KT-11-9-N4, 1♂ (cl 26.5 mm), 3ovig. ♀♀ (cl 26.9–29.2 mm), 3♀♀ (cl 27.4–33.4 mm), NSMT-Cr 22628; KT-11-9-T3, 4♂♂ (cl 18.2–25.1 mm), 2♀♀ (cl 27.2, 28.8 mm), 1juv. (cl 15.0 mm), NSMT-Cr 22629; KT-11-9-T4, 5ovig. ♀♀ (cl 25.6–33.2 mm), NSMT-Cr 22630; SO07-C1, 2♀♀ (cl 27.2, 28.8 mm), NSMT-Cr 22631; SO07-C1-B, 1♀ (cl 31.4 mm), NSMT-Cr 22632; SO10-C4-B, 1ovig. ♀ (cl 27.8 mm), 1♀ (cl 24.6 mm), NSMT-Cr 22633; SO12-C13, 1ovig. ♀ (cl 30.2 mm), 2♀♀ (cl 32.8, 33.2 mm), NSMT-Cr 22634; SO12-C13, 1♀ (cl 30.1 mm), NSMT-Cr 22635; SO13-C5-B, 8♂♂ (cl 8.9–24.4 mm), 1♀ (cl 27.1 mm), NSMT-Cr 22636.

Size. Largest male cl 27.1 mm, largest female 33.4 mm, ovigerous females cl 24.9–33.2 mm.

Distribution. North Pacific, Sea of Japan to Puget Sound, Washington State; Bering Sea; Chukchi Sea; 16–1380 m (Butler, 1980; Komai, 1999). In Japanese waters, occurring in Hokkaido, Sea of Japan southward to Tottori Prefecture, northeastern Honshu southward to Choshi, Chiba Prefecture (Komai and Komatsu, 2009).

Pandalus hypsinotus Brandt, 1851
[Japanese name: Toyama-ebi]

Pandalus hypsinotus – Urita, 1934: 258, figs. 1–2; Suzuki, 1979: 286; Doi, 1989: 54.

Material examined. TS09-T098, 2♂♂ (cl 33.5, 38.1 mm), NSMT-Cr 22637; KT-10-8-R1, 1♂ (cl 30.7 mm), 1transitional ♂ (cl 37.6 mm), NSMT-Cr 22638; KT-11-9-E1, 2♂♂ (cl 29.8–31.2 mm), 1♀ (cl 43.8 mm), NSMT-Cr 22639; SO13-C5, 2♂♂ (cl 20.3, 20.6 mm), NSMT-Cr 22640.

Distribution. North Pacific, Sea of Japan to British Columbia, Canada; Bering Sea; 5–501 m (Butler, 1980; Komai, 1999). In Japan, occurring in Hokkaido, Sea of Japan southward to Wakasa Bay, northeastern Honshu southward to Miyagi Prefecture (Komai, 1999; Hayashi, 2008b).

Infra Order Anomura
Family Paguridae
Elassochirus cavimanus Miers, 1879
[Japanese name: Goto-yadokari]

Eupagurus cavimanus – Yokoya, 1933: 81
Pagurus cavimanus – Miyake, 1957: 87; Kishida, 1963: 43, figs. 10–11; Suzuki, 1979: 300.

Material examined. TS09-T088, 1♂ (sl 9.3 mm), NSMT-Cr 22641; TS09-T107, 2♂♂ (sl 11.6, 15.0 mm), 2♀♀ (sl 13.9, 13.9 mm), NSMT-Cr 22642; KT-11-9-K2, 5♂♂ (sl 5.4–13.7 mm), NSMT-Cr 22643; KT-11-9-T2, 1♂ (sl 7.4 mm), NSMT-Cr 22644.

Distribution. Widespread in the North Pacific, from the Sea of Japan to British Columbia, Canada; 36–400 m (McLaughlin, 1974). In Sea of Japan, occurring in Hokkaido southward to Tottori Prefecture (Motoh, 2007).

Labidochirus anomalus (Balss, 1913)
[Japanese name: Nihon-samehada-hon-yadokari]

Eupagurus anomalus – Yokoya, 1933: 80

Material examined. KT-11-9-K2, 2♂♂ (sl 7.7–11.3 mm), NSMT-Cr 22645.

Distribution. Known only from East Asia, occurring in coast of Siberia, Hokkaido, northeastern Honshu, Sea of Japan southward to Tottori Prefecture, and Nagasaki Prefecture; 7–270 m (Yokoya, 1933; Minemizu, 2000; Motoh, 2007)

Pagurus rathbuni Benedict, 1892
[Japanese name: Rathbun-hon-yadokari]

Pagurus rathbuni – Kishida, 1963: 43, figs. 7–8.

Material examined. TS09-T034, 1♂ (sl 16.1 mm), 1♀ (sl 12.8 mm), NSMT-Cr 22646; TS09-T047, 2♂♂ (sl 10.8, 12.3 mm), NSMT-Cr 22647; TS09-T048, 1♂ (sl 13.1 mm), NSMT-Cr

22648; TS09-T102, 1♂ (sl 9.9 mm), NSMT-Cr 22649; KT-10-8-R2, 1♂ (sl 10.1 mm), NSMT-Cr 22650; KT-10-8-T1, 5juvs. (sl 2.3–4.7 mm), NSMT-Cr 22651; KT-11-9-E2, 1♂ (sl 3.0 mm), NSMT-Cr 22652; KT-11-9-E3, 3♂♂ (sl 4.5–6.0 mm), 6ovig. ♀♀ (sl 6.9–8.1 mm), NSMT-Cr 22653; KT-11-9-M4, 4♂♂ (sl 8.9–10.3 mm), 5♀♀ (sl 4.8–7.7 mm), NSMT-Cr 22654; KT-11-9-N3, 3♂♂ (sl 4.3–5.8 mm), 4♀♀ (sl 3.2–7.6 mm), NSMT-Cr 22655; KT-11-9-T2, 1♂ (sl 6.9 mm), NSMT-Cr 22656; KT-11-9-T3, 9♂♂ (sl 4.3–8.5 mm), 5♀♀ (sl 3.1–5.8 mm), 1juv. (sl 2.9 mm), NSMT-Cr 22657; KT-11-9-T4, 1♂ (sl 4.5 mm), NSMT-Cr 22658; SO13-C5-B, 2♂♂ (sl 4.8, 8.8 mm), NSMT-Cr 22659.

Distribution. Sea of Japan southward to Shimane Prefecture, Hokkaido, Sea of Okhotsk, Bering Sea, Chukchi Sea, Arctic Ocean to Point Barrow, 9–635 m (McLaughlin, 1974; Motoh, 2007; Komatsu and Komai, 2009; this study). Present record extends its bathymetrical range deeper to 635 m.

Pagurus trigonocheirus Stimpson, 1858
[Japanese name: Mitsukado-hon-yadokari]

Eupagurus trigonocheirus – Yokoya, 1933: 83.
Pagurus trigonocheirus – Suzuki, 1979: 300.

Material examined. TS09-T001, 1♂ (sl 14.2 mm), NSMT-Cr 22660; TS09-T002, 2♂♂ (sl 13.2, 18.1 mm), 4♀♀ (sl 8.3–13.5 mm), NSMT-Cr 22661; TS09-T003, 4♂♂ (sl 13.6–17.8 mm), NSMT-Cr 22662; TS09-T004, 4♂♂ (sl 15.5–17.4 mm), NSMT-Cr 22663; TS09-T006, 2♂♂ (sl 15.1, 17.6 mm), 1♀ (sl 14.8 mm), NSMT-Cr 22664; TS09-T046, 1♂ (sl 17.2 mm), NSMT-Cr 22665; TS09-T047, 1♂ (sl 18.8 mm), NSMT-Cr 22666; TS10-T25, 1♂ (sl 17.5 mm), NSMT-Cr 22667.

Distribution. Sea of Japan southward to Shimane Prefecture, Pacific coast of northeastern Honshu, Hokkaido, Sea of Okhotsk, Kurile Islands to Kamchatka, Bering Sea to Arctic Ocean; subtidal to 497 m (McLaughlin, 1974; Asakura, 2006; Motoh, 2007; Komatsu and Komai, 2009; this study).

Infraorder Brachyura
Family Oregoniidae
Chionoecetes japonicus Rathbun, 1932
[Japanese name: Beni-zuwai-gani]

Chionoecetes japonicus Rathbun, 1932: 32; Yamamoto, 1950: 519, fig. 1; Kamita, 1963: 26, fig. 2; Suzuki, 1979: 311; Honma and Muraoka, 1992: 41; Takeda *et al.*, 2011: 44, fig. 14(55).

Material examined. TS09-OW31, 3juvs. (cb 10.2–12.5 mm), NSMT-Cr 22668; TS09-OW32, 1juv. (cb 13.9 mm), NSMT-Cr 22669; TS09-OW32, 1♂ (cb 85.4 mm), 1ovig. ♀ (cb 70.3 mm), NSMT-Cr 22670; TS09-OW45, 1young ♂ (cb 16.5 mm), NSMT-Cr 22671; TS10-YA05, 1juv. (cb 8.1 mm), NSMT-Cr 22672; TS10-YA06, 1juv. (cb 9.1 mm), NSMT-Cr 22673; TS10-YA07, 8juvs. (cb 8.3–9.3 mm), NSMT-Cr 22674; TS10-YA09, 2juvs. (cb 8.5, 8.6 mm), NSMT-Cr 22675; TS10-YA11, 1young ♀ (cb 11.1 mm), 1juv. (cb 8.6 mm), NSMT-Cr 22676; TS10-YA16, 1juv. (cb 8.6 mm), NSMT-Cr 22677; TS13-YA13, 1young ♀ (cb 11.2 mm), NSMT-Cr 22678; KT-10-8-Es3, 1♂ (cb 89.2 mm), NSMT-Cr 22679; KT-10-8-R3, 1young ♂ (cb 30.1 mm), NSMT-Cr 22680; KT-10-8-R5, 1♂ (cb 97.8 mm), NSMT-Cr 22681; KT-10-8-R5, 2young ♀♀ (cb 26.2, 38.9 mm), NSMT-Cr 22682; KT-10-8-R6, 1♂ (cb 79.6 mm), NSMT-Cr

22683; KT-10-8-R6, 2young ♀♀ (cb 17.0, 23.1 mm), NSMT-Cr 22684; KT-10-8-T2, 1♂ (cb 84.7 mm), NSMT-Cr 22685; KT-10-8-T4, 1ovig. ♀ (cb 65.8 mm), NSMT-Cr 22686; KT-11-9-E3, 1young ♀ (cb 13.1 mm), NSMT-Cr 22687; KT-11-9-K2, 3young ♀♀ (cb 13.5–19.3 mm), NSMT-Cr 22688; KT-11-9-K5, 1♂ (cb 41.8 mm), 1young ♀ (cb 43.6 mm), NSMT-Cr 22689; KT-11-9-M4, 2young ♂♂ (cb 15.6, 16.8 mm), 2young ♀♀ (cb 15.3, 20.1 mm), NSMT-Cr 22690; KT-11-9-M5, 1young ♂ (cb 15.4 mm), 1young ♀ (cb 9.6 mm), NSMT-Cr 22691; KT-11-9-M5, 1♂ (cb 71.7 mm), NSMT-Cr 22692; KT-11-9-M6, 3♂♂ (cb 33.1–43.6 mm), 2young ♀♀ (cb 28.1–40.7 mm), NSMT-Cr 22693; KT-11-9-N4, 3young ♂♂ (cb 14.7–18.3 mm), 7young ♀♀ (cb 13.0–28.1 mm), NSMT-Cr 22694; KT-11-9-T5, 1♂ (cb 77.0 mm), NSMT-Cr 22695; KT-11-9-T6, 2young ♂♂ (cb 23.4, 34.3 mm), 1ovig. ♀ (cb 57.4 mm), NSMT-Cr 22696; SO07-C4-B2, 1♂ (cb 99.6 mm), NSMT-Cr 22697; SO10-C4-B, 3 young ♂♂ (cb 22.0–48.8 mm), 1ovig. ♀ (cb 66.3 mm), NSMT-Cr 22698; SO12-C15-B2, 1♂ (cb 84.3 mm), 1ovig. ♀ (cb 69.9 mm), NSMT-Cr 22699.

Distribution. Restricted to East Asian waters: Sea of Japan southward to Shimane Prefecture, Pacific coast of northern Japan southward to Sagami Bay, Sea of Okhotsk; 450–2500 m (Vinogradov, 1950; Sakai, 1976; Takeda and Miyauchi, 1992; Ikeda, 1998). Young female specimens were solely collected from off Kasumi, Hyogo Prefecture, at relatively shallow water (203 m deep) by present study.

Chionoecetes opilio (O. Fabricius, 1788)
[Japanese name: Zuwai-gani]

Chionoecetes opilio – Yokoya, 1933: 165; Suzuki, 1979: 309; Honma and Muraoka, 1992: 40; Takeda *et al.*, 2011: 45, fig. 14(56).

Chionoecetes opilio elongatus – Kamita, 1963: 26, fig. 1.

Material examined. TS10-T19, 1young ♀ (cb 13.3 mm), NSMT-Cr 22700; TS10-T21, 1juv. (cb 6.9 mm), NSMT-Cr 22701; KT-10-8-R2, 1young ♀ (cb 70.0 mm), NSMT-Cr 22702; KT-10-8-R3, 1young ♂ (cb 26.2 mm), NSMT-Cr 22703; KT-11-9-E2, 1young ♂ (cb 13.8 mm), 1young ♀ (cb 12.9 mm), NSMT-Cr 22704; KT-11-9-E3, 9♂♂ (cb 13.5–44.5 mm), 3♀♀ (cb 17.8–24.2 mm), NSMT-Cr 22705; KT-11-9-K3, 2♀♀ (cb 25.8, 77.2 mm), NSMT-Cr 22706; KT-11-9-M3, 1young ♀ (cb 56.4 mm), NSMT-Cr 22707; KT-11-9-M4, 1♂ (cb 49.0 mm), NSMT-Cr 22708; KT-11-9-N2, 1young ♂ (cb 17.5 mm), NSMT-Cr 22709; KT-11-9-N3, 3♂♂ (cb 23.1–50.7 mm), 1young ♂ (cb 13.6 mm), 1young ♀ (cb 37.0 mm), NSMT-Cr 22710; KT-11-9-T2, 1♂ (cb 77.6 mm), 1young ♀ (cb 40.1 mm), NSMT-Cr 22711; KT-11-9-T3, 2young ♀♀ (cb 33.0, 61.7 mm), NSMT-Cr 22712; SO13-C5-B, 1♂ (cb 67.5 mm), 1young ♂ (cb 24.0 mm), 1ovig. ♀ (cb 67.9 mm), NSMT-Cr 22713.

Distribution. Sea of Japan southward to coast of Korea, Pacific coast of Japan southward to Choshi, Chiba Prefecture, Northeast Siberia, Kamchatka, Okhotsk Sea, Bering Sea, Arctic Alaska, West Greenland, 20–1200 m deep (Sakai, 1976).

Hyas alutaceus Brandt, 1851
[Japanese name: Hiki-gani]

Hyas coarctatus alutaceus – Honma and Muraoka, 1992: 39; Takeda *et al.*, 2011: 45, fig. 14(58).

Material examined. TS09-T111, 1ovig. ♀ (cb 47.1 mm), NSMT-Cr 22714; TS10-T55, 1young ♂ (cb 15.1 mm), 1ovig. ♀ (cb 32.1 mm), 1young ♀ (cb 23.2 mm), NSMT-Cr 22715; KT-

Table 4. Checklist of deep-water species of decapod crustaceans known from the Japanese coast of the Sea of Japan, occurring at depths greater than 200 m. *: species not represented in the present collection.

Taxa	Source
Suborder Dendrobranchiata	
Family Penaeidae	
Metapenaeopsis mogiensis mogiensis (Rathbun, 1902)	this study
Suborder Pleocyemata	
Infraorder Caridea	
Family Crangonidae	
Aegaeon lacazei (Gourret, 1887)*	Kikuchi (1932; as *Egeon habereri*)
Argis hozawai (Yokoya, 1939)	Komai and Amaoka (1992); Motoh and Toyoda (2005); this study
Argis lar (Owen, 1839)	Suzuki (1979); Doi (1989); Motoh and Toyoda (2005); this study
Argis toyamaensis (Yokoya, 1933)	Yokoya (1933); Ito (1978; as *A. dentata*); Suzuki (1979; as *Nectocrangon dentata*); Doi (1989; as *N. dentata*); Komai (1997); Hayashi (2010); this study
Crangon affinis De Haan,1849*	Yokoya (1933)
Crangon dalli Rathbun, 1902	this study
Mesocrangon intermedia (Stimpson, 1860)	Komai (1994); this study
Metacrangon obliqua Komai, 2012	Komai (2012); this study
Metacrangon robusta (Kobjakova, 1935)	this study
Neocrangon communis (Rathbun, 1899)	Yokoya (1933); Suzuki (1979); this study
Neocrangon sagamiensis (Balss, 1913)	this study
Paracrangon abei Kubo, 1937*	Suzuki (1979)
Paracrangon echinata Dana, 1852	Komai and Kim (2004); this study
Paracrangon sp.	this study
Rhynocrangon sharpi (Ortmann, 1896)	Kim and Natsukari (2000); this study
Sclerocrangon boreas (Phipps, 1774)*	Suzuki (1979); Miyake (1982); Doi (1989)
Sclerocrangon salebrosa (Owen, 1839)*	Yokoya (1933; as *S. gasuyebi*); Kim & Komai (2002)
Family Hippolytidae	
Birulia kishinouyei (Yokoya, 1930)*	Suzuki (1979)
Eualus biunguis (Rathbun, 1902)	Yokoya (1933); Suzuki (1979); Doi (1989); this study
Eualus kuratai Miyake and Hayashi, 1967	this study
Eualus middendorffi Brashnikov, 1907*	Miyake and Hayashi (1967); Motoh and Yamaguchi (2009); Motoh *et al.* (2011)
Eualus pusiolus (Krøyer, 1841)*	Yokoya (1933)
Eualus spathulirostris (Yokoya, 1933)	this study
Eualus townsendi (Rathbun, 1902)*	Yokoya (1933; as *Spirontocaris minuta*)
Lebbeus elegans Komai, Hayashi and Kohtsuka, 2004*	Komai *et al.* (2004); Motoh and Yamaguchi (2009)
Lebbeus grandimana (Brushnikov, 1907)*	Hayashi (1992a)
Lebbeus groenlandicus (Fabricius,1775)	Yokoya (1933); Suzuki (1979); Doi (1989); this study
Lebbeus kuboi Hayashi, 1992*	Hayashi (1992a); Komai *et al.* (2004)
Lebbeus longipes (Kobjakova, 1936)	Hayashi (1976, 1992a); Doi (1989); Motoh and Yamaguchi (2009); this study
Lebbeus polyacanthus Komai, Hayashi and Kohtsuka, 2004	Komai *et al.* (2004); Motoh and Yamaguchi (2009); this study
Lebbeus unalaskensis (Rathbun, 1902)*	Yokoya (1933); Motoh and Yamaguchi (2009)
Spirontocaris brevidigitata Kobjakova, 1935	Suzuki (1979; as *S. spinus*); Motoh and Yamaguchi (2009; as *S. spina*); this study
Spirontocaris murdochi Rathbun, 1902*	Hayashi (1976)
Spirontocaris ochotensis (Brandt, 1851)*	Yokoya (1933; as *S. mororani*); Hayashi (1977)

Table 4. (continued)

Taxa	Source
Family Pandalidae	
Pandalopsis japonica Balss, 1914	Suzuki (1979); Doi (1989); Motoh and Yamaguchi (2009); this study
Pandalus eous Makarov, 1935	Suzuki (1979 as *P. borealis*); Doi (1989); Komai (1999); Motoh and Yamaguchi (2009); this study
Pandalus hypsinotus Brandt, 1851	Urita (1934); Suzuki (1979); Doi (1989); this study
Family Pasiphaeidae	
Pasiphaea japonica Omori, 1976*	Kikuchi (1932; as *P. sivado*); Omori (1976)
Infraorder Thalassinidea	
Family Callianassidae	
Ctenocheles balssi Kishinouye, 1926*	Suzuki (1979)
Infraorder Anomura	
Family Diogenidae	
Aniculus miyakei Forest, 1984*	Kishida (1963)
Dardanus arrosor (Herbst, 1796)*	Suzuki (1979)
Family Galatheidae	
Cervimunida princeps Benedict, 1902*	Suzuki (1979)
Galathea orientalis Stimpson, 1858*	Kikuchi (1932; as *G. acanthomera*)
Munida japonica Stimpson, 1858*	Yokoya (1933)
Family Lithodidae	
Paralithodes camtschticus (Tilesius, 1815)*	Suzuki (1979)
Family Paguridae	
Elassochirus cavimanus Miers, 1879	Yokoya (1933); Miyake (1957); Kishida (1963); Suzuki (1979); this study
Labidochirus anomalus (Balss, 1913)	Yokoya (1933); this study
Pagurus ochotensis Brandt, 1851*	Yokoya (1933); Suzuki (1979); Asakura (2006)
Pagurus rathbuni Benedict, 1892	Kishida (1963); this study
Pagurus trigonocheirus Stimpson, 1858	Yokoya (1933); Suzuki (1979); this study
Infraorder Brachyura	
Family Atelecyclidae	
Trichopeltarion balssi (Rathbun, 1932)*	Kikuchi (1932)
Family Cheiragonidae	
Erimacrus isenbecki (Brandt, 1848)*	Suzuki (1979); Yokoya (1933)
Telmessus cheiragonus (Tilesius, 1833)*	Suzuki (1979)
Family Corystidae	
Podocatactes hamifer Ortmann, 1894*	Kikuchi (1932); Yokoya (1933)
Family Dorippidae	
Paradorippe granulata (de Haan, 1839)*	Kikuchi (1932)
Family Epialtidae	
Pugettia similis Rathbun, 1932*	Kikuchi (1932)
Family Goneplacidae	
Carcinoplax longimana (de Haan, 1835)*	Kikuchi (1932)
Goneplax renoculis Rathbun, 1914*	Yokoya (1933)
Family Inachidae	
Achaeus tuberculatus Miers, 1879*	Kikuchi (1932); Yokoya (1933)
Macrocheira kaempferi (Temminck, 1836)*	Takeda *et al.* (2011)
Family Latreilliidae	
Eplumra phalangium de Haan, 1839*	Kikuchi (1932); Yokoya (1933); Suzuki (1979)
Latreillia valida de Haan, 1839*	Kikuchi (1932); Suzuki (1979)
Family Leucosiidae	
Ebalia tuberculosa (A. Milne-Edwards, 1873)*	Kikuchi (1932; as *E. japonica*); Yokoya (1933; as *E. japonica*)

Table 4. (continued)

Taxa	Source
Family Oregoniidae	
Chionoecetes angulatus Rathbun, 1924*	Honma and Muraoka (1992)
Chionoecetes bairdi Rathbun, 1924*	Takeda *et al.* (2011)
Chionoecetes japonicus Rathbun, 1932	Rathbun (1932); Yamamoto (1950); Kamita (1963); Suzuki (1979); Honma and Muraoka (1992); Takeda *et al.* (2011); this study
Chionoecetes opilio (O. Fabricius, 1788)	Yokoya (1933); Kamita (1963; as *C. opilio elongatus*); Suzuki (1979); Honma and Muraoka (1992); Takeda *et al.* (2011); this study
Hybrid of *Chionoecetes opilio* and *C. japonicus**	Nishimura and Mizusawa (1969); Horii (1982); Torisawa and Mitsuhashi (1989); Takeda *et al.* (2011)
Hyas alutaceus Brandt, 1851	Honma and Muraoka (1992); Takeda *et al.* (2011); this study
Oregonia gracilis Dana, 1851	Suzuki (1979); this study
Family Parthenopidae	
Garthambrus lacunosus (Rathbun, 1906)*	Kikuchi (1932)
Garthambrus pteromerus (Ortmann, 1893)*	Suzuki (1979)
Family Tymolidae	
Tymolus japonicus Stimpson, 1858*	Kikuchi (1932)
Family Varunidae	
Hemigrapsus longitarsis (Miers, 1879)*	Kikuchi (1932)

11-9-E2, 2♂♂ (cb 19.9, 39.2 mm), 1ovig. ♀ (cb 47.1 mm), 1 ♀ (cb 38.4 mm), NSMT-Cr 22716; KT-11-9-M2, 3♂♂ (cb 19.5–25.4 mm), 1young ♀ (cb 13.2 mm), NSMT-Cr 22717.

Distribution. East China Sea southward to Amoy, Sea of Japan southward to Hyogo Prefecture, Pacific coast of northern Japan southward to Kinkazan, Sea of Okhotsk, Kuril Islands, Bering Sea, 30–538 m deep (Motoh, 2003; Komatsu and Komai, 2009). Present record extends its bathymetrical range deeper to 538 m.

Oregonia gracilis Dana, 1851
[Japanese name: Kesen-gani]

Oregonia gracilis – Suzuki, 1979: 308.

Material examined. KT-11-9-N2, 1 ♀ (cb 17.1 mm), NSMT-Cr 22718.

Distribution. Yellow Sea, Sea of Japan, Pacific coast of northern Japan southward to off Choshi, Sea of Okhotsk, Kuril Islands, Bering Sea, Pacific coast of North America, shallow water to 370 m deep (Komai and Yakovlev, 2000).

Discussion

Remarks on the check list

Together with the previous records and the present study, 73 species of decapod crustaceans are recorded from the Japanese coast of the Sea of Japan, occurring at depths greater than 200 m (Table 4). There are still a few species of which the occurrence needs to be verified. Yokoya (1933) recorded *Crangon affinis* De Haan,1849 from Tsugaru Strait southward to Yamaguchi Prefecture at depths of 91–219 m, but the previous records from East Asian waters referred to *C. affinis* actually contains seven species (Hayashi and Kim, 1999; Hayashi, 2010). The specific identity of Yokoya's material is unknown at present, because the material was not reexamined. The confirmed bathymetrical range of *C. affinis* is 5–200 m (Hayashi and Kim, 1998, 1999).

Table 5. Summary of bathymetric ranges of decapod crustaceans collected from off the Japanese coast of the Sea of Japan.

Species/depths (m)	～200	300	400	500	600	700	800	900	1000	1100	1200
Metapenaeopsis mogiensis mogiensis		+									
Argis hozawai	+	+									
Argis lar	+	+	+								
Argis toyamaensis		+	+	+	+	+	+	+	+	+	+
Crangon dalli	+	+									
Mesocrangon intermedia	+	+									
Metacrangon obliqua		+									
Metacrangon robusta	+	+									
Neocrangon communis	+	+	+	+	+	+					
Neocrangon sagamiensis				+							
Paracrangon echinata		+									
Paracrangon sp.		+									
Rhynocrangon sharpi	+	+									
Eualus biunguis				+	+	+	+	+	+	+	+
Eualus kuratai		+									
Eualus spathulirostris	+	+									
Lebbeus groenlandicus		+	+								
Lebbeus longipes			+								
Lebbeus polyacanthus			+								
Spirontocaris brevidigitata		+	+	+	+						
Pandalopsis japonica		+	+	+							
Pandalus eous	+	+	+	+	+	+	+				
Pandalus hypsinotus	+	+	+								
Elassochirus cavimanus	+	+									
Labidochirus anomalus		+									
Pagurus rathbuni		+	+	+	+	+					
Pagurus trigonocheirus		+	+								
Chionoecetes japonicus		+			+	+	+	+	+	+	+
Chionoecetes opilio		+	+	+	+	+					
Hyas alutaceus	+	+	+	+	+						
Oregonia gracilis		+									

Species/depths (m)	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	Range
Metapenaeopsis mogiensis mogiensis											203
Argis hozawai											178–203
Argis lar											198–350
Argis toyamaensis	+	+	+	+	+	+					261–1704
Crangon dalli											199–262
Mesocrangon intermedia											178–247
Metacrangon obliqua											222–247
Metacrangon robusta											198–206
Neocrangon communis											178–627
Neocrangon sagamiensis											403–414
Paracrangon echinata											201–202
Paracrangon sp.											204
Rhynocrangon sharpi											178–247
Eualus biunguis	+	+	+	+	+						403–1607
Eualus kuratai											203–292
Eualus spathulirostris											199–203
Lebbeus groenlandicus											203–342
Lebbeus longipes											301–328
Lebbeus polyacanthus											306–328
Spirontocaris brevidigitata											251–535
Pandalopsis japonica											222–411
Pandalus eous		+									198–1377
Pandalus hypsinotus											178–328
Elassochirus cavimanus											200–258
Labidochirus anomalus											204
Pagurus rathbuni											207–635
Pagurus trigonocheirus											208–342
Chionoecetes japonicus	+	+	+	+	+	+	+		+	+	204–2106
Chionoecetes opilio											203–635
Hyas alutaceus											198–538
Oregonia gracilis											203

Kikuchi (1932) recorded *Garthambrus lacunosus* (Rathbun, 1906) from Toyama Bay at depths of 160–400 m, but this species is known only from its type locality, Hawaii, except for this record. Kikuchi (1932) also recorded *Hemigrapsus longitarsis* (Miers, 1879) from Toyama Bay at depths of 100–200 m, but this species generally habits littoral to 20 m (Sakai, 1976). It is highly possible that these records are due to misidentification.

Biogeography

According to Takeda (1995), the decapod crustaceans occurring in Japanese waters can be classified into four groups based on general distributional pattern: (1) species widely distributed in the northern North Pacific; (2) species endemic to East Asia; (3) species widely distributed in the West Pacific or Indo-West Pacific; and (4) introduced species. Species recorded in this study are referred to three groups except for the fourth.

(1) Northern North Pacific elements include 15 species (48% of the total 31 species): *Argis lar*, *Crangon dalli*, *Mesocrangon intermedia*, *Neocrangon communis*, *Paracrangon echinata*, *Rhynocrangon sharpi* (Crangonidae); *Eualus biunguis* (Hippolytidae); *Pandalus eous*, *P. hypsinotus* (Pandalidae); *Elassochirus cavimanus*, *Pagurus rathbuni*, *P. trigonocheirus* (Paguridae); *Chionoecetes opilio*, *Hyas alutaceus*, *Oregonia gracilis* (Oregoniidae).

(2) East Asian endemic elements contain 13 species (42%): *Argis hozawai* , *A. toyamaensis*, *Metacrangon obliqua*, *M. robusta*, *Neocrangon sagamiensis* (Crangonidae); *Eualus kuratai*, *E. spathulirostris*, *Lebbeus longipes*, *L. polyacanthus*, *Spirontocaris brevidigitata* (Hippolytidae); *Pandalopsis japonica*, (Pandalidae); *Labidochirus anomalus* (Paguridae); *Chionoecetes japonicus* (Oregoniidae).

(3) West Pacific or Indo-West Pacific elements include only one species (3 %): *Metapenaeopsis mogiensis mogiensis* (Penaeidae).

Lebbeus groenlandicus (Hippolytidae) is widely distributed in the cold waters around Arctic Sea and cannot be classified into above 4 groups. Because distributional information of *Paracrangon* sp. is limited, this species is not included in the above distributional classification.

Bathymetric range

The bathymetrical range of each species is summarized in Table 5. Most of the species occurred at depths shallower than 400 m. None of mesopelagic species has been recorded from the Sea of Japan, except for *Pasiphaea japonica* (Pasiphaeidae).

Bathymetrical zonation is recognized in *Argis* and *Chionoecetes* species. In the crangonid species of *Argis*, *A. hozawai* is dominant at shallower than 200 m deep, *A. lar* is dominant in 200–300 m deep, *A. toyamaensis* is dominant in 300–1800 m deep. In the snow crabs of *Chionoecetes*, *C. opilio* is dominant in 300–600 m deep and *C. japonicus* is dominant in 600–2000 m deep. Natural hybrids between *C. opilio* and *C. japonicus* were found at the depths where both species inhabit (Nishimura and Mizusawa, 1969; Horii, 1982; Torisawa and Mitsuhashi, 1989; Takeda *et al.*, 2011).

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