Deep-sea Fauna and Pollutants off Pacific Coast of Northern Japan, edited by T. Fujita, National Museum of Nature and Science Monographs, No. 39, pp. 581-613, 2009

Thalassinidea, Anomura and Brachyura (Crustacea: Decapoda) from Northeastern Japan Collected during the "Research on Deep-sea Fauna and Pollutants off Pacific Coast of Northern Japan" Project

Hironori Komatsu[1] and Tomoyuki Komai[2]

[1] Department of Zoology, National Museum of Nature and Science,
3–23–1 Hyakunincho, Shinjuku-ku, Tokyo, 169–0073 Japan
E-mail: h-komatu@kahaku.go.jp
[2] Natural History Museum and Institute, Chiba, 955–2 Aoba-cho, Chuo-ku, Chiba, 260–8682 Japan
E-mail: komai@chiba-muse.or.jp

Abstract: Reptantian decapod crustaceans (Thalassinidea, Anomura and Brachyura) from off the Pacific coast of northeastern Japan, collected during a four-year project of the National Museum of Nature and Science, "Research on Deep-sea Fauna and Pollutants off Pacific Coast of Northern Japan," are reported. The collection consists of 26 species of 12 families. A new species of ethusid crab, *Ethusina wakataka*, is described and illustrated based on a male specimen from off Soma, Fukushima Prefecture, at depths of 1466–1471 m. The new species can be distinguished from the known congeners primarily by the unique structure of the gonopods. The biogeography and the bathymetric distribution of the recorded species are briefly discussed.

Key words: Crustacea, Decapoda, Thalassinidea, Anomura, Brachyura, deep-sea, new species, *Ethusina wakataka*.

Introduction

Little has been published on the deep-water reptant decapods of the Pacific coast of northeastern Japan, although the area represents a major North Pacific fishing ground. 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 northeastern part of Honshu. A collection of decapods made by this survey was reported by Yokoya (1933), in which 18 reptant species were recorded from northeastern Honshu. Toriyama (1986) listed five species of anomuran and branchyuran crabs collected during the survey of the unexploited fisheries resources on the continental slopes off northeastern Honshu in 1977–1979, which was organized by the Fisheries Agency of Japan. Other published works on the reptant decapods of the lower shelf to bathyal zone of local waters include Igarashi (1970a, b), Sakai (1971, 1976), Miyake (1982, 1983), Takeda and Hayashi (1990), Takeda (1993), Kensley and Komai (1992), Komai *et al.* (1992), Komai (1993, 1997, 2000b) and Asakura (2006b). A checklist of species from the Pacific coast of northern Japan (Hokkaido to Ibaraki Prefecture), occurring in the lower shelf to the bathyal zone (>150 m), is given in Table 1.

The National Museum of Nature and Science has conducted a research project, "Study on Deep-Sea Fauna and Conservation of Deep-Sea Ecosystem," since 1993 to clarify the deep-sea fauna of Japan. The Pacific coast of northeastern Japan was selected as the survey area for the fourth term of the program,. The benthic animals were extensively sampled during four years (2005–2008) at depths of 150–2000 m from off Kushiro, eastern Hokkaido, southward to off Nakaminato, Ibaraki Prefecture. The collections of reptant crustaceans are referred to one species of one thalassinidean family, 13 species of four anomuran families, and 17 species of 10 brachyuran

Table 1. Sampling data of R/V *Walatala-maru* 2005, 2006, and 2007 cruises and previous research cruises. Abbreviations for sampling gears: BT: beam trawl with 2 m span opening; D: ORI biological dredge with 1 m span opening; O: otter trawl.

Stn. no.	Gear	Date	Position in	Position out	Depth (m)	Bottom Temp (˚C)
WA05-DE250	O	19 November 2005	38˚42.1´N, 141˚56.0´E	38˚40.5´N, 141˚55.4´E	252–251	6.4
WA05-DE380D	D	19 November 2005	38˚39.1´N, 142˚02.2´E	38˚38.6´N, 142˚02.1´E	375–373	–
WA05-DE410	O	20 November 2005	38˚39.3´N, 142˚03.4´E	38˚40.9´N, 142˚03.5´E	407–404	3.3
WA05-DE425	O	20 November 2005	38˚39.7´N, 142˚03.9´E	38˚41.3´N, 142˚04.3´E	421–423	3.3
WA05-DE510	O	21 November 2005	38˚39.0´N, 142˚07.3´E	38˚37.9´N, 142˚07.2´E	511–511	3.4
WA05-E410	O	25 October 2005	38˚23.7´N, 142˚02.6´E	38˚22.1´N, 142˚03.3´E	407–409	3.3
WA05-E480	O	25 October 2005	38˚22.6´N, 142˚05.3´E	38˚20.9´N, 142˚06.0´E	482–483	3.9
WA05-E550	O	26 October 2005	38˚22.6´N, 142˚07.3´E	38˚23.6´N, 142˚07.5´E	545–561	3.9
WA05-E650	O	26 October 2005	38˚23.0´N, 142˚10.7´E	38˚21.8´N, 142˚10.6´E	658–657	3.6
WA05-EF250D	D	17 November 2005	37˚58.7´N, 141˚49.3´E	37˚59.0´N, 141˚49.4´E	259–253	–
WA05-EF350	O	17 November 2005	37˚58.5´N, 141˚59.1´E	38˚00.1´N, 141˚59.8´E	358–359	3.7
WA05-EF425	O	18 November 2005	37˚44.3´N, 141˚54.8´E	38˚01.2´N, 142˚03.8´E	433–418	3.6
WA05-EF450	O	18 November 2005	38˚04.0´N, 142˚05.1´E	38˚02.2´N, 142˚04.9´E	454–454	3.7
WA05-EF450D	D	18 November 2005	38˚02.2´N, 142˚04.8´E	38˚02.6´N, 142˚04.9´E	452–454	–
WA05-F410	O	4 November 2005	37˚43.1´N, 141˚53.9´E	37˚44.8´N, 141˚53.5´E	411–411	4.0
WA05-F425	O	27 October 2005	37˚44.3´N, 141˚54.8´E	37˚42.5´N, 141˚55.0´E	424–424	4.1
WA05-F450	O	27 October 2005	37˚43.6´N, 141˚56.6´E	37˚45.3´N, 141˚56.4´E	449–449	4.2
WA05-F480	O	27 October 2005	37˚41.9´N, 141˚59.0´E	37˚40.2´N, 141˚59.0´E	484–480	4.4
WA05-F510	O	27 October 2005	37˚39.4´N, 142˚01.2´E	37˚38.2´N, 142˚01.1´E	508–506	4.3
WA05-F550	O	27 October 2005	37˚41.0´N, 142˚04.7´E	37˚42.0´N, 142˚04.0´E	551–546	4.2
WA05-F750	O	28 October 2005	37˚47.4´N, 142˚12.2´E	37˚48.4´N, 142˚11.8´E	749–744	3.5
WA05-F900	O	28 October 2005	37˚46.7´N, 142˚18.8´E	37˚45.7´N, 142˚19.1´E	900–904	3.3
WA05-F1200	O	28 October 2005	37˚47.6´N, 142˚37.1´E	37˚47.4´N, 142˚37.2´E	1196–1196	2.7
WA05-FG310	O	15 November 2005	37˚21.5´N, 141˚41.2´E	37˚19.7´N, 141˚41.2´E	311–312	5.8
WA05-FG350	O	14 November 2005	37˚20.3´N, 141˚43.2´E	37˚22.0´N, 141˚43.1´E	352–346	5.2
WA05-FG380	O	15 November 2005	37˚19.5´N, 141˚44.6´E	37˚21.1´N, 141˚44.8´E	383–383	4.3
WA05-FG450	O	14 November 2005	37˚18.8´N, 141˚47.2´E	37˚20.5´N, 141˚47.5´E	450–446	3.9
WA05-FG480	O	14 November 2005	37˚18.1´N, 141˚49.4´E	37˚16.5´N, 141˚48.9´E	480–480	3.8
WA05-FG510	O	15 November 2005	37˚17.7´N, 141˚50.3´E	37˚16.5´N, 141˚50.0´E	513–511	3.8
WA05-G210	O	29 October 2005	36˚58.3´N, 141˚25.6´E	36˚57.0´N, 141˚24.8´E	211–210	8.0
WA05-G250	O	29 October 2005	36˚58.3´N, 141˚25.6´E	36˚57.0´N, 141˚24.8´E	251–255	5.9
WA05-G280	O	29 October 2005	36˚55.4´N, 141˚24.9´E	36˚54.0´N, 141˚24.2´E	277–279	4.9
WA05-G350	O	3 November 2005	36˚56.3´N, 141˚30.9´E	36˚58.0´N, 141˚31.5´E	373–356	4.0
WA05-G425	O	9 November 2005	36˚53.2´N, 141˚29.2´E	36˚52.1´N, 141˚27.7´E	427–418	4.0
WA05-G450	O	9 November 2005	36˚51.6´N, 141˚28.7´E	36˚52.8´N, 141˚30.0´E	454–448	4.0
WA05-G480	O	3 November 2005	36˚50.2´N, 141˚27.9´E	36˚51.3´N, 141˚29.2´E	481–484	4.2
WA05-G510	O	9 November 2005	36˚51.6´N, 141˚30.3´E	36˚52.4´N, 141˚31.4´E	507–509	4.0
WA05-G650	O	9 November 2005	36˚50.2´N, 141˚34.2´E	36˚50.9´N, 141˚35.2´E	644–650	3.7
WA05-G900	O	10 November 2005	36˚49.9´N, 141˚41.0´E	36˚49.3´N, 141˚40.5´E	901–901	3.2
WA05-GH250	O	11 November 2005	36˚41.9´N, 141˚11.4´E	36˚40.5´N, 141˚10.2´E	251–249	7.6
WA05-GH280	O	11 November 2005	36˚40.1´N, 141˚11.1´E	36˚41.5´N, 141˚12.3´E	278–278	8.0
WA05-GH310	O	11 November 2005	36˚40.3´N, 141˚12.4´E	36˚41.7´N, 141˚13.6´E	308–309	5.3
WA05-GH350	O	11 November 2005	36˚39.7´N, 141˚13.5´E	36˚41.0´N, 141˚15.0´E	344–351	4.3
WA05-GH380	O	12 November 2005	36˚40.4´N, 141˚15.6´E	36˚39.0´N, 141˚14.5´E	376–381	4.2
WA05-GH410	O	13 November 2005	36˚37.5´N, 141˚14.0´E	36˚38.3´N, 141˚15.7´E	417–413	4.1
WA05-GH425	O	13 November 2005	36˚39.5´N, 141˚17.3´E	36˚40.9´N, 141˚18.3´E	425–422	4.0
WA05-GH450	O	13 November 2005	36˚41.6´N, 141˚20.1´E	36˚40.2´N, 141˚19.0´E	454–452	4.1
WA05-GH480	O	13 November 2005	36˚40.8´N, 141˚20.8´E	36˚42.3´N, 141˚21.6´E	482–479	4.1
WA05-GH510	O	11 November 2005	36˚40.3´N, 141˚21.6´E	36˚41.3´N, 141˚22.2´E	509–511	4.1
WA05-H150	O	30 October 2005	36˚29.9´N, 140˚57.0´E	36˚31.3´N, 140˚58.1´E	154–156	10.9
WA05-H280	O	30 October 2005	36˚29.4´N, 140˚59.1´E	36˚30.8´N, 141˚00.2´E	277–281	4.6

Table 1. (Continued)

Stn. no.	Gear	Date	Position in	Position out	Depth (m)	Bottom Temp (˚C)
WA05-H310	O	30 October 2005	36˚29.0′N, 140˚59.5′E	36˚30.5′N, 141˚00.4′E	311–306	4.5
WA05-H380	O	1 November 2005	36˚29.1′N, 141˚00.8′E	36˚30.0′N, 141˚01.7′E	380–384	4.0
WA05-H410	O	1 November 2005	36˚31.0′N, 141˚03.1′E	36˚32.0′N, 141˚04.0′E	411–410	4.1
WA05-H510	O	31 October 2005	36˚30.6′N, 141˚05.2′E	36˚31.4′N, 141˚06.1′E	507–510	4.1
WA05-H750	O	2 November 2005	36˚33.6′N, 141˚20.1′E	36˚34.1′N, 141˚21.2′E	748–758	3.5
WA06-A150	O	9 October 2006	40˚47.6′N, 141˚49.4′E	40˚46.9′N, 141˚51.1′E	155–149	13.7
WA06-A150D	D	9 October 2006	40˚46.5′N, 141˚51.9′E	40˚46.5′N, 141˚52.2′E	146–147	–
WA06-A250	O	10 October 2006	40˚51.8′N, 141˚50.6′E	40˚50.9′N, 141˚51.4′E	274–260	5.5
WA06-A250D	D	10 October 2006	40˚51.4′N, 141˚50.9′E	40˚51.3′N, 141˚51.1′E	267–266	–
WA06-A510	O	10 October 2006	41˚00.5′N, 141˚46.2′E	41˚00.0′N, 141˚46.9′E	511–510	3.0
WA06-B150	O	14 October 2006	40˚13.6′N, 142˚07.1′E	40˚15.1′N, 142˚06.6′E	153–151	13.7
WA06-B310D	D	14 October 2006	40˚09.9′N, 142˚13.2′E	40˚10.0′N, 142˚13.2′E	305–305	–
WA06-B350	O	15 October 2006	40˚06.8′N, 142˚15.0′E	40˚08.3′N, 142˚14.6′E	348–353	3.0
WA06-B410	O	14 October 2006	40˚12.8′N, 142˚14.7′E	40˚14.4′N, 142˚14.3′E	406–408	2.7
WA06-B450	O	13 October 2006	40˚14.9′N, 142˚15.3′E	40˚13.3′N, 142˚16.1′E	461–475	2.8
WA06-B650	O	13 October 2006	40˚20.4′N, 142˚17.8′E	40˚19.4′N, 142˚18.4′E	644–654	3.3
WA06-C310	O	16 October 2006	39˚48.3′N, 142˚16.3′E	39˚46.9′N, 142˚16.2′E	303–298	3.0
WA06-C350	O	15 October 2006	39˚46.5′N, 142˚17.0′E	39˚48.1′N, 142˚17.0′E	362–355	2.7
WA06-C350D	D	15 October 2006	39˚48.9′N, 142˚17.1′E	39˚49.0′N, 142˚17.2′E	357–364	–
WA06-C450	O	16 October 2006	39˚42.3′N, 142˚18.2′E	39˚40.7′N, 142˚17.7′E	482–454	3.0
WA06-D210D	D	19 October 2006	38˚56.4′N, 141˚59.3′E	38˚56.2′N, 141˚59.2′E	213–214	–
WA06-D450D	D	17 October 2006	39˚02.4′N, 142˚10.5′E	39˚02.7′N, 142˚10.6′E	460–460	–
WA06-D1500	O	17 October 2006	39˚12.1′N, 142˚42.1′E	39˚11.9′N, 142˚42.2′E	1492–1509	–
WA06-DE410	O	24 November 2006	38˚39.3′N, 142˚03.4′E	38˚40.9′N, 142˚03.7′E	408–408	3.1
WA06-DE480	O	23 November 2006	38˚38.9′N, 142˚05.7′E	38˚39.8′N, 142˚05.9′E	476–476	3.4
WA06-E150	O	5 November 2006	38˚20.0′N, 141˚44.5′E	38˚18.2′N, 141˚44.1′E	154–151	13.0
WA06-E210	O	5 November 2006	38˚22.2′N, 141˚51.3′E	38˚24.0′N, 141˚51.6′E	209–212	9.1
WA06-E250	O	5 November 2006	38˚23.3′N, 141˚53.9′E	38˚21.6′N, 141˚54.1′E	242–244	–
WA06-E280	O	4 November 2006	38˚21.8′N, 141˚56.4′E	38˚23.6′N, 141˚56.6′E	275–275	4.2
WA06-E310	O	4 November 2006	38˚23.2′N, 141˚58.2′E	38˚21.5′N, 141˚58.4′E	305–309	3.6
WA06-E380	O	4 November 2006	38˚23.4′N, 142˚01.6′E	38˚21.9′N, 142˚02.3′E	377–382	3.3
WA06-E410	O	3 November 2006	38˚23.7′N, 142˚02.6′E	38˚22.1′N, 142˚03.3′E	406–409	3.3
WA06-E450	O	3 November 2006	38˚23.5′N, 142˚04.0′E	38˚25.2′N, 142˚03.6′E	448–451	3.6
WA06-E480	O	3 November 2006	38˚22.7′N, 142˚05.2′E	38˚21.2′N, 142˚05.9′E	480–484	3.4
WA06-E510	O	3 November 2006	38˚22.6′N, 142˚06.3′E	38˚23.9′N, 142˚05.7′E	514–506	3.4
WA06-E510D	D	3 November 2006	38˚23.8′N, 142˚05.6′E	38˚24.1′N, 142˚05.4′E	503–498	–
WA06-E550	O	3 November 2006	38˚23.4′N, 142˚07.3′E	38˚22.3′N, 142˚07.3′E	553–545	3.4
WA06-E650	O	2 November 2006	38˚21.7′N, 142˚10.6′E	38˚22.9′N, 142˚10.7′E	656–660	9.6
WA06-E750	O	2 November 2006	38˚23.1′N, 142˚14.5′E	38˚22.4′N, 142˚14.1′E	758–756	3.2
WA06-EF380	O	22 November 2006	38˚02.3′N, 142˚02.1′E	38˚04.0′N, 142˚02.5′E	378–373	4.1
WA06-EF410	O	22 November 2006	38˚05.3′N, 142˚03.7′E	38˚03.6′N, 142˚03.7′E	410–409	3.9
WA06-EF425	O	21 November 2006	38˚00.9′N, 142˚03.8′E	38˚02.7′N, 142˚04.1′E	414–431	3.9
WA06-EF425D	D	21 November 2006	38˚03.3′N, 142˚04.0′E	38˚03.1′N, 142˚04.1′E	420–424	–
WA06-F150	O	29 October 2006	37˚35.3′N, 141˚33.2′E	37˚36.7′N, 141˚33.9′E	150–165	13.7
WA06-F210	O	29 October 2006	37˚36.9′N, 141˚35.9′E	37˚38.2′N, 141˚36.1′E	213–213	6.5
WA06-F250	O	29 October 2006	37˚38.1′N, 141˚39.1′E	37˚36.4′N, 141˚38.8′E	257–256	5.7
WA06-F280	O	29 October 2006	37˚35.7′N, 141˚41.0′E	37˚37.5′N, 141˚40.9′E	277–284	4.9
WA06-F310	O	29 October 2006	37˚36.8′N, 141˚43.7′E	37˚36.1′N, 141˚43.6′E	313–309	4.1
WA06-F350	O	30 October 2006	37˚37.6′N, 141˚47.3′E	37˚39.2′N, 141˚47.4′E	353–350	3.9
WA06-F380	O	30 October 2006	37˚38.5′N, 141˚50.5′E	37˚40.1′N, 141˚50.6′E	386–379	3.8

Table 1. (Continued)

Stn. no.	Gear	Date	Position in	Position out	Depth (m)	Bottom Temp (˚C)
WA06-F410	O	30 October 2006	37˚43.0´N, 141˚53.9´E	37˚44.6´N, 141˚53.6´E	411–411	3.3
WA06-F425	O	30 October 2006	37˚44.0´N, 141˚54.8´E	37˚42.3´N, 141˚55.1´E	425–424	3.4
WA06-F450	O	30 October 2006	37˚43.6´N, 141˚56.6´E	37˚45.2´N, 141˚56.4´E	450–450	3.4
WA06-F480	O	31 October 2006	37˚41.7´N, 141˚59.0´E	37˚39.9´N, 141˚59.0´E	483–478	3.6
WA06-F510	O	31 October 2006	37˚38.6´N, 142˚01.1´E	37˚39.8´N, 142˚01.4´E	503–511	3.8
WA06-F550	O	31 October 2006	37˚42.1´N, 142˚04.1´E	37˚40.9´N, 142˚04.7´E	546–551	3.7
WA06-F650	O	31 October 2006	37˚42.9´N, 142˚09.7´E	37˚44.0´N, 142˚09.1´E	654–651	3.7
WA06-F750	O	1 November 2006	37˚47.3´N, 142˚12.2´E	37˚48.1´N, 142˚12.0´E	749–747	3.4
WA06-F1500D-1	D	1 November 2006	37˚34.6´N, 142˚33.5´E	37˚35.0´N, 142˚33.5´E	1511–1508	–
WA06-F1500D-2	D	1 November 2006	37˚38.9´N, 142˚34.1´E	37˚39.4´N, 142˚34.3´E	1466–1471	–
WA06-FG310	O	19 November 2006	37˚21.6´N, 141˚41.2´E	37˚19.8´N, 141˚41.2´E	312–313	4.8
WA06-FG410	O	10 November 2006	37˚18.8´N, 141˚45.8´E	37˚17.1´N, 141˚45.5´E	410–410	4.2
WA06-FG425	O	10 November 2006	37˚17.8´N, 141˚46.2´E	37˚19.5´N, 141˚46.6´E	426–425	4.2
WA06-FG450	O	10 November 2006	37˚18.8´N, 141˚47.2´E	37˚20.5´N, 141˚47.5´E	449–444	4.0
WA06-FG480	O	10 November 2006	37˚18.2´N, 141˚49.5´E	37˚16.5´N, 141˚48.8´E	480–477	3.8
WA06-FG510	O	10 November 2006	37˚16.5´N, 141˚50.0´E	37˚17.6´N, 141˚50.2´E	511–512	3.8
WA06-G150	O	26 October 2006	36˚59.8´N, 141˚17.4´E	37˚01.4´N, 141˚17.9´E	151–150	12.3
WA06-G210	O	26 October 2006	36˚57.0´N, 141˚22.7´E	36˚58.4´N, 141˚23.8´E	210–208	8.9
WA06-G250	O	26 October 2006	36˚58.4´N, 141˚25.7´E	36˚57.0´N, 141˚24.8´E	251–252	6.9
WA06-G280	O	26 October 2006	36˚55.5´N, 141˚24.9´E	36˚54.0´N, 141˚24.2´E	276–279	5.3
WA06-G310	O	26 October 2006	36˚56.2´N, 141˚26.9´E	36˚54.8´N, 141˚26.5´E	301–315	4.8
WA06-G350	O	27 October 2006	36˚56.2´N, 141˚30.8´E	36˚57.9´N, 141˚31.5´E	373–355	5.0
WA06-G380	O	27 October 2006	36˚53.4´N, 141˚27.4´E	36˚54.5´N, 141˚28.9´E	384–377	4.7
WA06-G425	O	27 October 2006	36˚53.2´N, 141˚29.2´E	36˚52.1´N, 141˚27.6´E	428–420	5.0
WA06-G450	O	27 October 2006	36˚51.5´N, 141˚28.6´E	36˚52.7´N, 141˚30.0´E	454–454	4.6
WA06-G480	O	28 October 2006	36˚51.2´N, 141˚29.2´E	36˚50.0´N, 141˚27.7´E	481–483	4.5
WA06-G510	O	28 October 2006	36˚51.4´N, 141˚30.1´E	36˚52.1´N, 141˚31.2´E	508–508	4.4
WA06-G550	O	28 October 2006	36˚58.1´N, 141˚38.0´E	36˚59.2´N, 141˚38.8´E	558–554	4.2
WA06-G650	O	28 October 2006	36˚50.2´N, 141˚34.3´E	36˚50.9´N, 141˚35.2´E	648–648	3.8
WA06-G750	O	15 November 2006	36˚46.3´N, 141˚35.5´E	36˚46.4´N, 141˚35.7´E	753–754	3.6
WA06-G900	O	11 November 2006	36˚50.2´N, 141˚41.3´E	36˚49.4´N, 141˚40.7´E	907–910	3.2
WA06-G1200	O	11 November 2006	36˚51.8´N, 141˚48.0´E	36˚51.3´N, 141˚47.6´E	1207–1200	–
WA06-G1200D	D	11 November 2006	36˚52.6´N, 141˚48.6´E	36˚52.3´N, 141˚48.2´E	1201–1182	–
WA06-GH280	O	17 November 2006	36˚41.5´N, 141˚12.3´E	36˚40.0´N, 141˚11.0´E	278–278	6.9
WA06-GH425	O	18 November 2006	36˚39.4´N, 141˚17.3´E	36˚40.9´N, 141˚18.3´E	425–422	4.7
WA06-GH450	O	16 November 2006	36˚41.6´N, 141˚20.1´E	36˚40.3´N, 141˚19.0´E	453–450	4.5
WA06-GH480D	D	18 November 2006	36˚40.0´N, 141˚20.3´E	36˚39.8´N, 141˚20.0´E	483–478	–
WA06-GH510	O	16 November 2006	36˚40.3´N, 141˚21.6´E	36˚41.2´N, 141˚22.2´E	509–510	4.3
WA06-H150	O	12 November 2006	36˚31.3´N, 140˚58.2´E	36˚29.9´N, 140˚57.1´E	157–154	12.8
WA06-H210	O	13 November 2006	36˚30.0´N, 140˚58.4´E	36˚31.4´N, 140˚59.0´E	213–193	11.8
WA06-H280	O	13 November 2006	36˚30.8´N, 141˚00.2´E	36˚29.4´N, 140˚59.1´E	282–279	5.9
WA06-H310	O	12 November 2006	36˚30.6´N, 141˚00.6´E	36˚29.1´N, 140˚59.5´E	309–310	5.5
WA06-H350	O	12 November 2006	36˚29.3´N, 141˚00.4´E	36˚27.8´N, 140˚59.5´E	353–353	5.0
WA06-H380	O	12 November 2006	36˚30.1´N, 141˚01.8´E	36˚28.7´N, 141˚00.6´E	385–378	4.8
WA06-H410	O	13 November 2006	36˚30.9´N, 141˚03.1´E	36˚32.3´N, 141˚04.3´E	413–407	4.3
WA06-H450	O	13 November 2006	36˚30.4´N, 141˚03.6´E	36˚29.0´N, 141˚02.3´E	456–447	3.8
WA06-H480	O	13 November 2006	36˚32.1´N, 141˚06.0´E	36˚32.7´N, 141˚06.9´E	481–480	4.2
WA06-H510	O	14 November 2006	36˚30.3´N, 141˚04.9´E	36˚31.1´N, 141˚05.9´E	508–510	3.9
WA06-H1500D	D	15 November 2006	36˚36.5´N, 141˚36.2´E	36˚36.7´N, 141˚36.1´E	1470–1450	–
WA07-A150	O	7 October 2007	40˚47.5´N, 141˚49.6´E	40˚46.8´N, 141˚51.3´E	154–146	15.2
WA07-A210	O	7 October 2007	40˚51.4´N, 141˚41.8´E	40˚51.7´N, 141˚39.8´E	207–215	7.2

Table 1. (Continued)

Stn. no.	Gear	Date	Position in	Position out	Depth (m)	Bottom Temp (˚C)
WA07-A250	O	6 October 2007	40˚51.8′N, 141˚50.6′E	40˚50.5′N, 141˚51.9′E	273–258	5.4
WA07-A250D	D	6 October 2007	40˚51.0′N, 141˚51.2′E	40˚50.9′N, 141˚51.5′E	258–258	–
WA07-A310	O	6 October 2007	40˚49.4′N, 141˚55.0′E	40˚50.6′N, 141˚53.5′E	306–309	3.6
WA07-A350	O	7 October 2007	40˚55.3′N, 141˚43.2′E	40˚55.2′N, 141˚44.7′E	360–359	–
WA07-A410	O	9 October 2007	40˚57.9′N, 141˚42.5′E	40˚57.5′N, 141˚43.3′E	412–415	3.4
WA07-A450	O	9 October 2007	40˚58.7′N, 141˚45.6′E	40˚58.3′N, 141˚46.1′E	471–468	3.4
WA07-A510	O	9 October 2007	41˚00.6′N, 141˚46.1′E	41˚00.4′N, 141˚46.4′E	510–512	3.3
WA07-A550	O	9 October 2007	41˚00.9′N, 141˚48.7′E	41˚00.6′N, 141˚49.0′E	550–551	3.3
WA07-A650	O	10 October 2007	41˚04.9′N, 141˚48.9′E	41˚04.5′N, 141˚49.2′E	662–661	3.3
WA07-A750	O	10 October 2007	41˚07.6′N, 141˚50.0′E	41˚07.4′N, 141˚50.1′E	748–747	3.1
WA07-B150	O	14 October 2007	40˚15.0′N, 142˚06.6′E	40˚13.3′N, 142˚07.4′E	153–156	9.8
WA07-B210	O	13 October 2007	40˚08.6′N, 142˚11.4′E	40˚10.1′N, 142˚11.1′E	208–214	5.7
WA07-B250	O	13 October 2007	40˚08.5′N, 142˚12.4′E	40˚06.8′N, 142˚13.2′E	249–258	4.3
WA07-B310	O	13 October 2007	40˚13.4′N, 142˚12.4′E	40˚11.7′N, 142˚12.8′E	309–307	3.5
WA07-B350	O	13 October 2007	40˚06.4′N, 142˚15.1′E	40˚08.2′N, 142˚14.6′E	350–352	3.4
WA07-B410	O	13 October 2007	40˚15.4′N, 142˚14.1′E	40˚13.7′N, 142˚14.6′E	420–412	3.4
WA07-B410D	D	13 October 2007	40˚16.9′N, 142˚13.5′E	40˚17.1′N, 142˚13.5′E	416–416	–
WA07-B450	O	12 October 2007	40˚13.2′N, 142˚15.7′E	40˚14.7′N, 142˚15.4′E	454–459	3.5
WA07-B510	O	12 October 2007	40˚16.0′N, 142˚16.0′E	40˚17.3′N, 142˚15.6′E	510–509	3.4
WA07-B550	O	12 October 2007	40˚16.9′N, 142˚16.6′E	40˚18.0′N, 142˚16.5′E	544–555	3.4
WA07-B650	O	11 October 2007	40˚19.8′N, 142˚18.0′E	40˚20.6′N, 142˚17.7′E	644–640	3.3
WA07-B750	O	11 October 2007	40˚19.7′N, 142˚21.3′E	40˚20.1′N, 142˚20.9′E	759–749	3.3
WA07-C210	O	15 October 2007	39˚41.3′N, 142˚12.6′E	39˚43.1′N, 142˚12.9′E	211–208	7.7
WA07-C250	O	15 October 2007	39˚40.0′N, 142˚14.3′E	39˚41.7′N, 142˚14.5′E	254–252	5.6
WA07-C310	O	14 October 2007	39˚47.3′N, 142˚16.4′E	39˚45.6′N, 142˚16.0′E	318–294	3.9
WA07-C350	O	15 October 2007	39˚45.7′N, 142˚16.9′E	39˚47.4′N, 142˚17.0′E	358–358	3.9
WA07-C350D	D	15 October 2007	39˚44.2′N, 142˚16.9′E	39˚44.4′N, 142˚16.9′E	355–354	–
WA07-C410	O	14 October 2007	39˚50.3′N, 142˚17.9′E	39˚48.5′N, 142˚17.9′E	409–415	3.7
WA07-C450	O	17 October 2007	39˚42.3′N, 142˚18.0′E	39˚40.6′N, 142˚17.7′E	467–458	3.7
WA07-C510	O	14 October 2007	39˚52.5′N, 142˚19.8′E	39˚51.2′N, 142˚20.0′E	511–521	3.5
WA07-C550	O	16 October 2007	39˚35.5′N, 142˚18.6′E	39˚34.2′N, 142˚18.5′E	552–559	3.6
WA07-C650	O	16 October 2007	39˚34.3′N, 142˚20.3′E	39˚35.5′N, 142˚20.3′E	659–644	3.4
WA07-C750	O	16 October 2007	39˚34.1′N, 142˚22.5′E	39˚33.5′N, 142˚22.3′E	748–749	3.4
WA07-D210D	D	18 October 2007	38˚57.4′N, 141˚59.7′E	38˚57.7′N, 141˚59.9′E	213–213	–
WA07-D310	O	18 October 2007	38˚53.5′N, 142˚02.8′E	38˚55.0′N, 142˚03.3′E	303–307	4.6
WA07-D350	O	18 October 2007	38˚55.1′N, 142˚05.7′E	38˚53.5′N, 142˚05.2′E	354–351	5.0
WA07-D410	O	17 October 2007	39˚04.2′N, 142˚09.5′E	39˚06.0′N, 142˚09.8′E	406–406	4.1
WA07-D450	O	17 October 2007	39˚03.4′N, 142˚10.4′E	39˚01.5′N, 142˚10.5′E	448–463	3.7
WA07-D510	O	17 October 2007	39˚04.2′N, 142˚11.8′E	39˚05.3′N, 142˚12.0′E	505–513	3.6
WA07-D550	O	5 October 2007	39˚03.7′N, 142˚12.8′E	39˚04.9′N, 142˚12.7′E	556–545	3.6
WA07-D650	O	5 October 2007	39˚02.3′N, 142˚14.7′E	39˚03.3′N, 142˚14.9′E	640–661	3.6
WA07-D750	O	5 October 2007	38˚58.7′N, 142˚16.4′E	38˚59.5′N, 142˚16.6′E	754–751	3.4
WA07-D900	O	5 October 2007	39˚05.3′N, 142˚20.0′E	39˚06.0′N, 142˚20.1′E	898–905	3.2
WA07-E550	O	25 October 2007	38˚22.7′N, 142˚07.4′E	38˚23.9′N, 142˚07.2′E	549–549	3.5
WA07-F150	O	29 October 2007	37˚35.3′N, 141˚33.3′E	37˚36.9′N, 141˚33.9′E	153–163	13.4
WA07-F250	O	29 October 2007	37˚38.1′N, 141˚39.0′E	37˚36.5′N, 141˚38.8′E	256–254	–
WA07-F450	O	4 November 2007	37˚43.5′N, 141˚56.6′E	37˚45.1′N, 141˚56.4′E	451–450	4.7
WA07-G280	O	3 November 2007	36˚55.5′N, 141˚24.9′E	36˚53.9′N, 141˚24.1′E	275–278	6.5
WA07-G1200T	O	31 October 2007	36˚51.8′N, 141˚47.9′E	36˚51.4′N, 141˚47.6′E	1202–1202	–
WA07-H1500T	O	1 November 2007	36˚35.8′N, 141˚36.0′E	36˚36.1′N, 141˚35.9′E	1473–1433	–
WA9101-5	BT	20 October 1991	40˚40.0′N, 141˚49.8′E	40˚39.8′N, 141˚49.6′E	97–95	15.7

Table 1. (Continued)

Stn. no.	Gear	Date	Position in	Position out	Depth (m)	Bottom Temp (˚C)
WA9201-K5-3	BT	13 February 1992	40˚48.1´N, 141˚44.5´E	40˚47.9´N, 141˚45.2´E	150–151	8.7
WA9201-K6-2	BT	13 February 1992	40˚43.7´N, 141˚44.4´E	40˚43.8´N, 141˚45.7´E	100–101	8.8
WA9201-K7-1	BT	13 February 1992	40˚37.8´N, 141˚38.3´E	40˚37.3´N, 141˚38.3´E	65–66	8.8
WA9204-K4-4	D	29 August 1992	42˚40.8´N, 144˚40.1´E	42˚40.8´N, 144˚39.6´E	252–237	1.8
WA9206-A41	D	5 November 1992	40˚40.2´N, 141˚37.6´E	40˚40.5´N, 141˚37.3´E	68–69	15.4
WA9302-K02	D	17 April 1993	40˚14.9´N, 142˚06.6´E	40˚14.7´N, 142˚06.8´E	151	7.1
WA9303-K12	D	29 May 1993	40˚13.6´N, 142˚07.5´E	40˚13.3´N, 142˚07.6´E	155–156	9.1
WA9303-K14	D	29 May 1993	40˚14.8´N, 142˚09.5´E	40˚14.4´N, 142˚09.6´E	200–200	–
WA95-B1300	O	12 November 1995	40˚42.4´N, 143˚03.8´E	40˚44.8´N, 143˚19.7´E	1290–1366	2.4–2.8
WA95-B2000	O	13 November 1995	40˚36.1´N, 143˚21.5´E	40˚48.9´N, 142˚29.1´E	2014–2056	1.9
WA95-D2000	O	7 November 1995	39˚22.8´N, 143˚07.7´E	39˚30.4´N, 143˚10.8´E	1949–2005	1.7
WA95-J2000	O	10 November 1995	36˚25.2´N, 141˚32.5´E	36˚31.0´N, 141˚43.6´E	1845–1948	1.9–2.3

Table 2. Sampling data of R/V *Tansei-maru* KT-07-29 cruise. Abbreviation for sampling gear: BT: beam trawl with 3 m span opening.

Stn. no.	Gear	Date	Position in	Position out	Depth (m)	Locality
KT-07-29-M1	BT	5 November 2007	39˚17.9´N, 142˚28.4´E	39˚16.8´N, 142˚27.4´E	1039–1041	off Miyako
KT-07-29-M2	BT	5 November 2007	39˚16.2´N, 142˚41.1´E	39˚18.6´N, 142˚43.7´E	1528–1603	off Miyako
KT-07-29-M3-1	BT	5 November 2007	39˚20.0´N, 142˚51.0´E	39˚21.8´N, 142˚51.9´E	1728–1719	off Miyako
KT-07-29-M3-2	BT	6 November 2007	39˚20.2´N, 142˚51.4´E	39˚19.2´N, 142˚49.2´E	1737–1709	off Miyako
KT-07-29-M3-3	BT	8 November 2007	39˚20.1´N, 142˚51.2´E	39˚19.2´N, 142˚49.1´E	1733–1695	off Miyako
KT-07-29-K1	BT	7 November 2007	42˚35.0´N, 144˚48.0´E	42˚34.7´N, 144˚49.9´E	1028–1075	off Kushiro
KT-07-29-K2	BT	7 November 2007	42˚30.3´N, 144˚50.5´E	42˚30.6´N, 144˚52.2´E	1535–1543	off Kushiro
KT-07-29-K3	BT	7 November 2007	42˚27.6´N, 144˚57.4´E	42˚27.6´N, 144˚59.4´E	2037–2025	off Kushiro
KT-07-29-E1	BT	7 November 2007	41˚43.0´N, 143˚56.7´E	41˚44.5´N, 143˚56.5´E	1031–1008	off Erimo Cape
KT-07-29-E3	BT	7 November 2007	41˚39.1´N, 144˚07.5´E	41˚37.2´N, 144˚07.6´E	1997–2043	off Erimo Cape
KT-07-29-H1	BT	8 November 2007	40˚48.7´N, 142˚00.1´E	40˚47.4´N, 142˚00.5´E	497–454	off Hachinohe
KT-07-29-H2	BT	8 November 2007	40˚00.0´N, 143˚31.4´E	41˚00.8´N, 143˚30.2´E	2055–2032	off Hachinohe

families. Of these one thalassinidean, 11 anomuran and 14 brachyuran species occur in the bathyal zone. A new species of the ethusid genus *Ethusina*, *E. wakataka*, is described and illustrated.

Materials and Methods

This study primarily deals with the specimens of reptant crustaceans collected from off Pacific coast of northeastern Japan, using R/V *Wakataka-maru* of the Fisheries Research Agency (FRA) (used gears include otter trawl and biological dredge of 1 m span opening) and 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). Data of sampling stations of R/Vs *Wakataka-maru* and *Tansei-maru* are summarized in Table 1 and Fig.1, and Table 2, 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, *Erimacrus isenbeckii*, *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, Tokyo (NSMT).

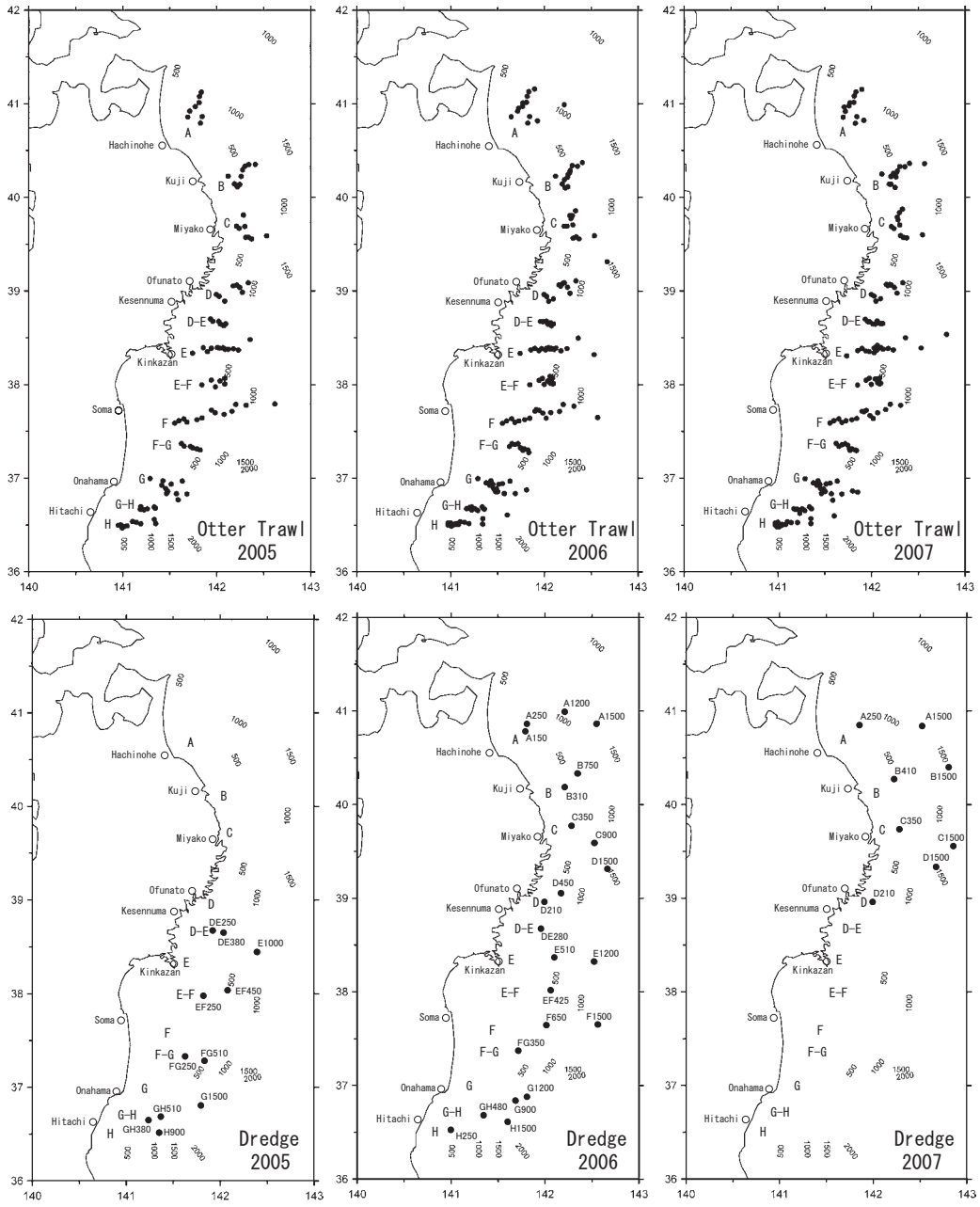

Fig. 1. Sampling sites for otter trawl and dredge operations by the R/V *Wakataka-maru* in 2005–2007.

Measurements of specimens are provided as follows: the postorbital carapace length (cl) for thalassinidean shrimps, the shield length (sl) for hermit crabs, and the carapace breadth (cb) and occasionally the carapace length (cl) for lithodid and brachyuran crabs. In the lithodid and brachyuran crabs, the carapace breadth was measured across the greatest breadth excluding lateral spines; the carapace length was measured from the level of the base of the rostral spines to the posterior margin of carapace. Terminology and measurements in description of *Ethusina wakataka* sp. nov. follow Castro (2005). Other abbreviations used in the text are: G1, male first gonopod; G2, male second gonopod; P2–5, second to fifth pereiopods.

Taxonomic Account

Infraorder Thalassinidea
Family Axiidae
Calocarides soyoi Yokoya, 1933
[Japanese name: Soyo-ana-ebi]
(Fig. 2A)

Material examined. WA05-G150, 1 ♀ (cl 10.3 mm), NSMT-Cr 17000; WA06-G150, 1 ♀ (cl 13.3 mm), NSMT-Cr 17140.

Distribution. Known only from Japanese Pacific coast from Fukushima Prefecture to Kyushu; 138–270 m deep (Yokoya, 1933; Kensley and Komai, 1992).

Infraorder Anomura
Family Galatheidae
Phylladiorhynchus pusillus (Henderson, 1885)
[Japanese name: Hiratsuno-koshiori-ebi]

Material examined. WA06-G150, 1 ♂ (cl 4.1 mm), NSMT-Cr 17146; WA06-H310, 2 ♂♂ (cl 3.5, 4.7 mm), 3 ovig. ♀♀ (cl 3.5–3.6 mm), NSMT-Cr 17145.

Distribution. Widespread in the Indo-Pacific, Red Sea to New Zeeland, and to Japan, and in the eastern Pacific from Juan Fernandez; shallow subtidal to 580 m (Baba, 2005). In Japanese waters, extending northerly to Tsugaru Strait (Baba, 2005).

Family Lithodidae
Lithodes aequispina Benedict, 1894
[Japanese name: Ibara-gani-modoki]
(Fig. 3A)

Material examined. WA05-H410, 1 ♀ (cb 165.0 mm), NSMT-Cr 18995; WA06-B410, 1 young ♀ (cb 27.9 mm), NSMT-Cr 17133; WA06-G750, 1 young ♀ (cb 63.5 mm), NSMT-Cr 17134; WA07-B550, 1 young ♀ (cb 31.6 mm), NSMT-Cr 18925.

Distribution. Pacific coast of Japan from Hokkaido to off Mie Prefecture, Sea of Okhotsk, Bering Sea, Canada, 274–1100 m deep (Dawson, 1989; Ikeda, 1998).

Paralomis verrilli (Benedict, 1895)
[Japanese name: Gokaku-ezo-ibara-gani]

Material examined. WA95-J2000, 1 ♀ (cb 89.8 mm), NSMT-Cr 18960.

Distribution. Widely distributed in the northern part of the North Pacific, from Pacific coast of Japan southward to Tokushima Prefecture, to California; 850–2379 m (Sakai, 1976; K. Sakai, 1987). Specimens from hydrothermal vents on the Iheya Ridge, Okinawa Trough, referred to *Paralomis verrilli* (cf. Watabe and Miyake, 2000), may represent an undescribed species (T. Komai, personal observation).

Fig. 2. A, *Calocarides soyoi* Yokoya, 1933; B, *Elassochirus cavimanus* Miers, 1879; C, *Pagurus pectinatus* (Stimpson, 1858); D, *Pagurus rathbuni* Benedict, 1892; E, *Pagurus townsendi* Benedict, 1892; F, *Pagurus trigonocheirus* Stimpson, 1858; G, *Parapagurus benedicti* de Saint Laurent, 1972.

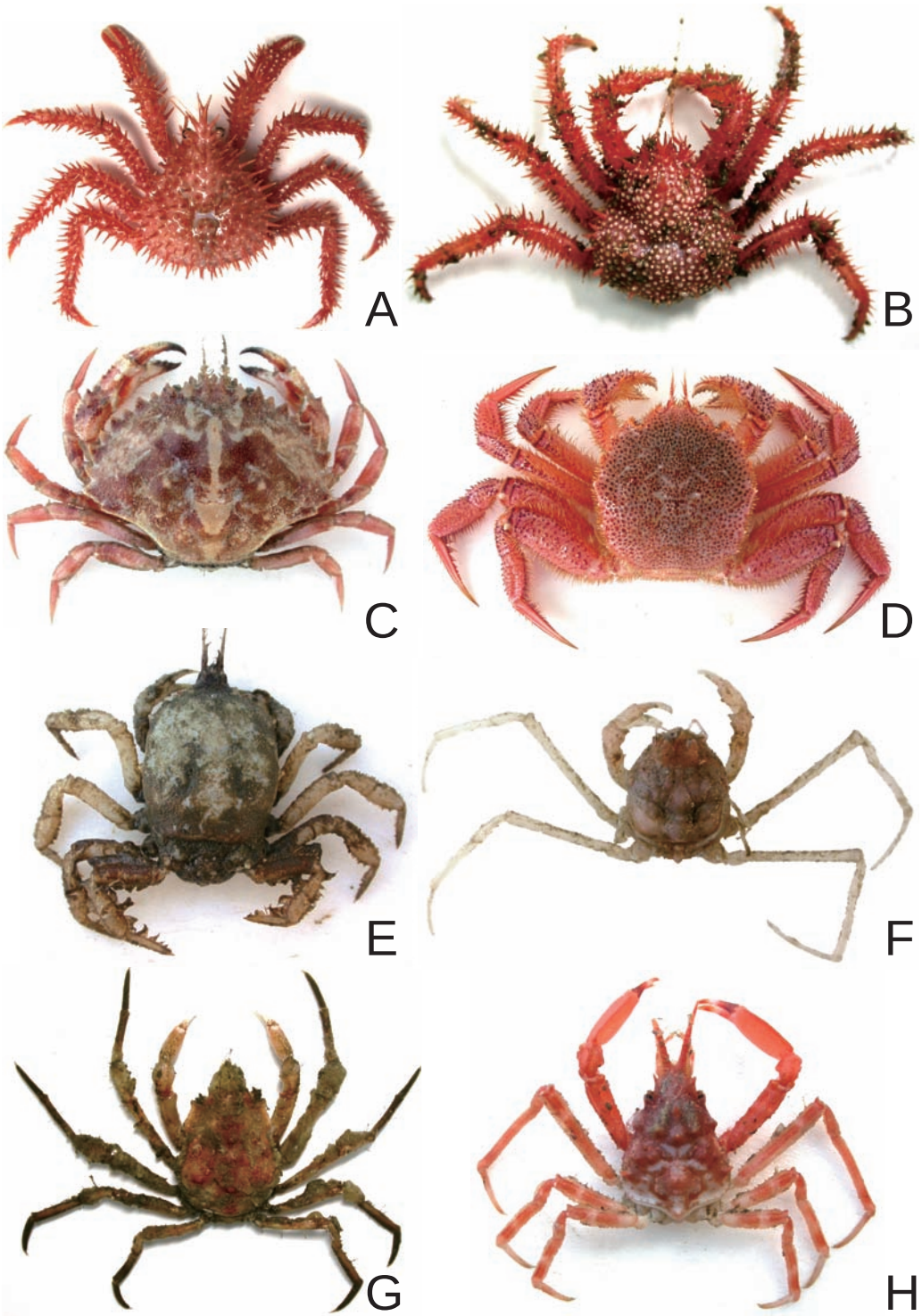

Fig. 3. A, *Lithodes aequispina* Benedict, 1894; B, *Paralomis multispina* Benedict, 1895; C, *Cancer gibbosulus* de Haan, 1833; D, *Erimacrus isenbeckii* (Brandt, 1848); E, *Podocatactes hamifer* Ortmnann, 1894; F, *Tymolus uncifer* (Ortmann, 1892); G, *Hyas alutaceus* Brandt, 1851; H, *Chorilia japonica* Miers, 1879.

Paralomis multispina Benedict, 1895
[Japanese name: Ezo-ibara-gani]
(Fig. 3B)

Material examined. KT-07-29-E1, 1 young ♂ (cb 17.1 mm), NSMT-Cr 18988; WA07-G1200, 1 young ♂ (cb 14.2 mm), NSMT-Cr 18928.

Distribution. Widely distributed in the North Pacific, Japan from Hokkaido to Okinawa Trough, Ryukyu Islands, Sea of Okhotsk, Bering Sea, northwest coast of North America, 500–1665 m deep (Sakai, 1976; Martin and Haney, 2005).

Family Paguridae
Alloeopagurodes spiniacicula Komai, 1998
[New Japanese name: Hotei-yadokari]

Material examined. WA06-A150D, 5 ♂♂ (sl 2.4–3.9 mm), NSMT-Cr 17143; WA9303-K12, 2 ♂♂ (sl 3.0, 3.4 mm), NSMT-Cr 17620.

Remarks. Alloeopagurodes spiniacicula was originally described on the basis of material from off Taito-saki, Boso Peninsula, central Japan, and Funakoshi Bay, Iwate Prefecture, although the type specimens all came from shallow waters at depths of 53–120 m (Komai, 1998). Recently, the species was recorded from Taiwan at depths of 232–349 m (McLaughlin *et al.*, 2007). The present record slightly extends the geographical distribution of the species northward to off Hachinohe, Aomori Prefecture.

Distribution. Known from Pacific coast of northeastern Honshu, Japan, and Taiwan, 53–259 m deep, possibly to 349 m (Komai, 1998; McLaughlin *et al.*, 2007).

Elassochirus cavimanus Miers, 1879
[Japanese name: Goto-yadokari]
(Fig. 2B)

Material examined. WA05-G280, 5 ovig. ♀♀ (sl 11.8–15.5 mm), NSMT-Cr 17039; WA05-G350, 4 ♂♂ (sl 8.2–17.5 mm), 1 ovig. ♀ (sl 11.8 mm), 1 ♀ (sl 9.2 mm), NSMT-Cr 17040; WA05-GH250, 2 ♂♂ (sl 17.2, 18.3 mm), NSMT-Cr 17041; WA05-GH280, 6 ♂♂ (sl 9.3–18.6 mm), 2 ovig. ♀♀ (sl 14.1, 15.2 mm), 1 ♀ (sl 16.1 mm), NSMT-Cr 17042; WA05-GH350, 2 ♂♂ (sl 16.9, 20.8 mm), NSMT-Cr 17043; WA05-H280, 7 ♂♂ (sl 12.0–17.8 mm), NSMT-Cr 17044; WA05-H380, 1 ♂ (sl 12.9 mm), NSMT-Cr 17045; WA06-D210D, 1 ♀ (sl 6.5 mm), NSMT-Cr 17225; WA06-E150, 1 ♂ (sl 7.7 mm), NSMT-Cr 17214; WA06-E210, 1 ♂ (sl 13.1 mm), 1 ovig. ♀ (sl 12.5 mm), 1 ♀ (sl 7.8 mm), NSMT-Cr 17222; WA06-E250, 1 ♂ (sl 15.0 mm), 1 ovig. ♀ (sl 14.2 mm), NSMT-Cr 17220; WA06-E280, 2 ♂♂ (sl 13.4, 13.7 mm), NSMT-Cr 17217; WA06-F150, 2 ♂♂ (sl 6.8, 8.4 mm), NSMT-Cr 17218; WA06-F210, 2 ♀♀ (sl 11.8, 12.0 mm), NSMT-Cr 17226; WA06-F250, 1 ♂ (sl 15.9 mm), 1 ovig.♀ (sl 15.0 mm), NSMT-Cr 17221; WA06-F280, 2 ♂♂ (sl 17.6, 18.5 mm), NSMT-Cr 17215; WA06-G160, 1 ♂ (sl 13.0 mm), NSMT-Cr 17212; WA06-G210, 1 ♂ (sl 15.8 mm), 1 ovig. ♀ (sl 11.5 mm), NSMT-Cr 17219; WA06-G250, 2 ♂♂ (sl 10.0, 10.8 mm), 1 ♀ (sl 8.1 mm), NSMT-Cr 17224; WA06-G280, 1 ♂ (sl 18.1 mm), NSMT-Cr 17213; WA06-G310, 1 ovig. ♀ (sl 13.7 mm), NSMT-Cr 17227; WA06-G350, 2 ♂♂ (sl 11.7, 14.0 mm), 1 ovig. ♀ (sl 14.6 mm), NSMT-Cr 17223; WA06-G380, 2 ♂♂ (sl 14.3, 15.9 mm), NSMT-Cr 17216; WA06-H150, 1 ♂, NSMT-Cr 17578; WA06-H280, 19 ♂♂ (sl 10.2–15.3 mm), 3 ovig. ♀♀ (sl 10.9–15.7 mm), 3 ♀♀ (sl 9.2–10.6 mm), NSMT-Cr 17228; WA06-H310, 6 ♂♂ (sl 11.3–17.7 mm), 2 ovig. ♀♀ (sl 13.1,

13.4 mm), 1 ♀ (sl 8.1 mm), NSMT-Cr 17229; WA07-A210, 1 ♂ (sl 7.9 mm), NSMT-Cr 18919; WA07-A250, 1 ♂ (sl 8.9 mm), 1 ♀ (sl 9.3 mm), NSMT-Cr 18920; WA07-B150, 1 ♂ (sl 7.6 mm), NSMT-Cr 18921.

Remarks. This species was abundant at the depths of 150–250 m in the surveyed area.

Distribution. Widespread in the North Pacific, from the Sea of Japan to British Columbia, Canada; 36–400 m (McLaughlin, 1974).

Pagurus parvispina Komai, 1997
[New Japanese name: Kotsume-hon-yadokari]

Material examined. WA06-F210, 1 ♂ (sl 8.0 mm), NSMT-Cr 17142.

Distribution. Previously known only from northern Japan (Hokkaido and Iwate Prefecture, 150–200 m deep (Komai, 1997). The present record slightly extends the geographical distribution of the species southward to off Soma, Fukushima Prefecture, and bathymetrical range to 213 m.

Pagurus pectinatus (Stimpson, 1858)
[Japanese name: Kaimen-hon-yadokari]
(Fig. 2C)

Material examined. WA06-A150, 1 ♂ (sl 4.4 mm), NSMT-Cr 17139; WA06-E150, 1 ♂ (sl 12.1 mm), NSMT-Cr 17141; WA07-A150, 1 ♂ (sl 7.8 mm), NSMT-Cr 18926; WA07-B150, 1 ♂ (sl 4.2 mm), NSMT-Cr 18927; WA9101, st. 5, 1 ex., NSMT-Cr 17616; WA9201, K-7, st. 1, 2 ♂♂ (sl 5.0–8.8 mm), 2 ovig. ♀♀ (sl 8.4, 8.4 mm), 1 ♀ (sl 8.1 mm), 1 ♀ with rhizocepharan parasite (sl 12.2 mm), NSMT-Cr 17617.

Distribution. Restricted to cold waters in East Asia, including East China Sea, Yellow Sea, Korea, Russian Far East, Hokkaido, Pacific coast of Honshu southward to Onagawa Bay, 4–71 m deep (Komai, 2000a). The present records extend the bathymetric range to 156 m.

Pagurus proximus Komai, 2000
[Japanese name: Ikubi-hon-yadokari]

Material examined. WA06-A150, 1 ♂ (sl 2.7 mm), NSMT-Cr 17279.

Remarks. Komai (2000b) revealed that three species had been confounded under the name *Pagurus brachiomastus* (Thallwitz, 1891) in previous literature, of them two were described as new, *P. proximus* and *P. simulans*. Based on the material available at that time, Komai (2000b) argued that *P. proximus* geographically overlap with *P. simulans*, but the two are bathymetrically separated. However, the present record reveals that *P. proximus* could occur at the sublittoral depths down to 155 m.

Distribution. Restricted to East Asia, known from Sea of Japan, southern Hokkaido to Suruga Bay along the Pacific coast of Japan, Peter the Great Bay, intertidal to 155 m deep (Komai, 2000b; Asakura, 2006a; present study).

Pagurus rathbuni Benedict, 1892
[Japanese name: Rathbun-hon-yadokari]
(Fig. 2D)

Material examined. WA05-FG310, 1 ♂ with rhizocepharan parasites (sl 9.6 mm), NSMT-Cr

16999; WA06-E310, 3 ♂♂ (sl 7.5–10.2 mm), 1 ovig. ♀ (sl 8.0 mm), 1 ♀ (sl 6.3 mm), NSMT-Cr 17135; WA06-G350, 1 ovig. ♀ (sl 6.8 mm), NSMT-Cr 17138; WA06-H380, 3 ♀♀ (sl 8.3–11.0 mm), NSMT-Cr 17136; WA06-H410, 1 ♂ (sl 12.0 mm), NSMT-Cr 17137; WA07-B350, 1 ♂ (sl 6.3 mm), NSMT-Cr 18922; WA07-B410, 6 ♂♂ (sl 6.4–9.2 mm), 13 ovig. ♀♀ (sl 6.2–7.8 mm), NSMT-Cr 18923; WA07-B410D, 1 ovig. ♀ (sl 6.7 mm), 1 juv. (sl 1.3 mm), NSMT-Cr 18924.

Distribution. Sea of Japan, Hokkaido, Sea of Okhotsk, Bering Sea, Chukchi Sea, Arctic Ocean to Point Barrow, 9–210 m (McLaughlin, 1974). This study reveals that this species extends southward to Ibaraki Prefecture in the northeastern Honshu and deep to 420 m.

Pagurus townsendi Benedict, 1892
[Japanese name: Hiodoshi-hon-yadokari]
(Fig. 2E)

Material examined. KT-07-29-H1, 2 ♂♂ (sl 11.9, 13.5 mm), 1 ovig. ♀ (sl 8.2 mm), 6 juvs. (sl 2.3–2.6 mm), NSMT-Cr 18978; WA05-DE410, 1 ♂ (sl 8.9 mm), NSMT-Cr 17002; WA05-DE510, 1 ♂ (sl 6.0 mm), 1 ovig. ♀ (sl 6.6 mm), 1 ♀ (sl 6.8 mm), 1 ♀ with rhizocepharan parasite (sl 6.1 mm), NSMT-Cr 17003; WA05-E480, 1 ♂ (sl 5.7 mm), 1 ovig. ♀ (sl 8.3 mm), 1 ♀ (sl 5.6 mm), NSMT-Cr 17004; WA05-E550, 1 ♂ (sl 11.2 mm), NSMT-Cr 17005; WA05-E650, 4 ♂♂ (sl 9.0–15.6 mm), 1 ♀ (sl 7.0 mm), NSMT-Cr 17006; WA05-EF350, 1 ♂ (sl 6.6 mm), NSMT-Cr 18994; WA05-EF425, 4 ♂♂ (sl 3.2–5.6 mm), NSMT-Cr 17007; WA05-EF450, 3 ♂♂ (sl 5.4–9.2 mm), 1 ovig. ♀ (sl 7.9 mm), 1 ♀ (sl 5.4 mm), NSMT-Cr 17008; WA05-EF450D, 1juv (sl 2.2 mm), NSMT-Cr 17009; WA05-EF450D, 1 ♂ (sl 13.2 mm), NSMT-Cr 17010; WA05-F410, 1 ♂ (sl 6.5 mm), NSMT-Cr 17011; WA05-F425, 2 ♂♂ (sl 6.0, 8.6 mm), 3 ♀♀ (sl 5.5–8.4 mm), NSMT-Cr 17012; WA05-F450, 1 ♂ (sl 7.3 mm), 1 ♀ (sl 10.3 mm), NSMT-Cr 17013; WA05-F450, 1 ♂ with rhizocepharan parasite (sl 5.5 mm), NSMT-Cr 17014; WA05-F480, 2 ♂♂ (sl 12.0, 13.6 mm), 1 ovig. ♀ (sl 8.9 mm), 1 ♀ (sl 6.6 mm), NSMT-Cr 17015; WA05-F510, 3 ♂♂ (sl 7.9–15.0 mm), NSMT-Cr 17016; WA05-F550, 2 ♂♂ (sl 7.8, 8.4 mm), 1 ovig. ♀ (sl 11.6 mm), NSMT-Cr 17017; WA05-F750, 1 ♂ (sl 9.8 mm), NSMT-Cr 17018; WA05-FG310, 1 ♂ (sl 6.2 mm), 1 ovig. ♀ (sl 7.8 mm), NSMT-Cr 17019; WA05-FG380, 3 ♂♂ (sl 3.6–6.8 mm), 1 ♀ (sl 5.1 mm), NSMT-Cr 17020; WA05-FG450, 4 ♂♂ (sl 4.2–6.2 mm), NSMT-Cr 17021; WA05-FG480, 1 ♂ (sl 4.5 mm), 1 ovig. ♀ (sl 6.4 mm), 3 ♀♀ (sl 6.5–8.2 mm), NSMT-Cr 17022; WA05-FG510, 1 ♂ (sl 16.1 mm), NSMT-Cr 17023; WA05-G425, 1 ♂ (sl 8.1 mm), NSMT-Cr 17024; WA05-G425, 2 ♂♂ (sl 5.6, 6.0 mm), 1 ♂ with rhizocepharan parasites (sl 7.6 mm), 2 ovig. ♀♀ (sl 6.4, 7.6 mm), NSMT-Cr 17025; WA05-G450, 3 ♂♂ (sl 4.8–6.6 mm), 1 ♂ with rhizocepharan parasites (sl 5.0 mm), 1 ovig. ♀ (sl 8.7 mm), 1 ♀ (sl 7.7 mm), 1 ♀ with rhizocepharan parasite (sl 5.6 mm), NSMT-Cr 17026; WA05-G480, 1 ♂ (sl 5.5 mm), 1 ♂ with rhizocepharan parasites (sl 7.6 mm), 2 ♀♀ (sl 6.1, 7.8 mm), NSMT-Cr 17027; WA05-G510, 2 ♂♂ (sl 7.6, 9.4 mm), 1 ovig. ♀ (sl 9.4 mm), NSMT-Cr 18993; WA05-G650, 2 ♂♂ (sl 7.6, 10.4 mm), 1 ♂ with rhizocepharan parasites (sl 10.6 mm), NSMT-Cr 17028; WA05-G900, 1 ♂ (sl 7.7 mm), 1 ♂ with rhizocepharan parasites (sl 8.5 mm), NSMT-Cr 17029; WA05-GH350, 2 ♂♂ (sl 13.1, 14.9 mm), NSMT-Cr 17030; WA05-GH380, 1 ♀ with rhizocepharan parasite (sl 10.2 mm), NSMT-Cr 17031; WA05-GH410, 1 ♀ (sl 4.5 mm), NSMT-Cr 17032; WA05-GH425, 3 ♂♂ (sl 4.0–4.8 mm), 3 ovig. ♀♀ (sl 6.2–7.0 mm), NSMT-Cr 17033; WA05-GH450, 1 ♂ (sl 5.5 mm), 1 ovig. ♀ (sl 9.7 mm), 3 ♀♀ (sl 4.2–6.5 mm), NSMT-Cr 17034; WA05-GH480, 2 ♂♂ (sl 4.9, 6.4 mm), NSMT-Cr 17035; WA05-H380, 2 ♀♀ (sl 5.6, 6.2 mm), NSMT-Cr 17036; WA05-H510, 1juv (sl 3.4 mm), NSMT-Cr 17037; WA05-H750, 1 ♂ (sl 6.4 mm), NSMT-Cr 17038; WA06-A510, 1 ♀ (sl 6.1 mm), NSMT-Cr 17173; WA06-B450, 1 ♀ (sl 8.4 mm), NSMT-Cr 17175; WA06-B650, 2 ♂♂ (sl 8.1, 9.3 mm), 1 ovig. ♀ (sl 7.2 mm), 2 ♀♀ (sl 7.3, 8.9 mm), NSMT-Cr 17167; WA06-D450D, 2 juvs. (sl 3.1, 3.9 mm), NSMT-Cr 17181; WA06-DE480, 1 ♀ (sl 3.3 mm), NSMT-Cr

17564; WA06-E450, 1 ♂ (sl 13.4 mm), 1 ovig. ♀ (sl 8.1 mm), NSMT-Cr 17157; WA06-E480, 1 ♂ (sl 8.3 mm), 1 ovig. ♀ (sl 8.9 mm), NSMT-Cr 17163; WA06-E510, 1 ♂ with rhizocepharan parasite (sl 8.4 mm), 1 ovig. ♀ (sl 7.9 mm), NSMT-Cr 17184; WA06-E510D, 2 ovig. ♀ (sl 5.4, 9.9 mm), NSMT-Cr 17166; WA06-E550, 2 ♂♂ (sl 4.9, 8.9 mm), 1 ovig. ♀ (sl 7.7 mm), NSMT-Cr 17165; WA06-E650, 1 ♂ (sl 13.0 mm), 1 ♀ (sl 6.5 mm), NSMT-Cr 17151; WA06-E750, 1 ♂ (sl 9.5 mm), 1 ovig. ♀ (sl 7.5 mm), NSMT-Cr 17164; WA06-EF380, 1 ♂ (sl 3.7 mm), NSMT-Cr 17565; WA06-EF410, 1 ♀ (sl 3.3 mm), NSMT-Cr 17566; WA06-EF425, 1 ♂ (sl 3.0 mm), NSMT-Cr 17567; WA06-EF425D, 1 ♂ (sl 3.7 mm), 1 ♀ (sl 4.5 mm), NSMT-Cr 17172; WA06-EF425D, 4 juvs. (sl 1.8–2.4 mm), NSMT-Cr 17568; WA06-F350, 1 ovig. ♀ (sl 6.0 mm), 1 ♀ (sl 6.8 mm), NSMT-Cr 17159; WA06-F350, 1 ♂ (sl 6.6 mm), NSMT-Cr 17569; WA06-F380, 1 ♂ (sl 6.5 mm), 1 ovig. ♀ (sl 6.0 mm), NSMT-Cr 17161; WA06-F410, 4 ♂♂ (sl 5.6–9.4 mm), NSMT-Cr 17156; WA06-F425, 2 ♂♂ (sl 9.6, 13.6 mm), NSMT-Cr 17171; WA06-F450, 1 ♂ (sl 7.8 mm), 1 ovig. ♀ (sl 7.0 mm), 1 ♀ (sl 6.8 mm), NSMT-Cr 17180; WA06-F480, 1 ♂ (sl 15.2 mm), 2 ♀♀ (sl 7.3, 8.5 mm), NSMT-Cr 17153; WA06-F510, 1 ♂ (sl 15.5 mm), 2 ovig. ♀♀ (sl 7.3, 11.3 mm), NSMT-Cr 17185; WA06-F550, 2 ♂♂ (sl 5.4, 14.6 mm), 2 ovig. ♀♀ (sl 6.9, 10.5 mm), NSMT-Cr 17169; WA06-F650, 2 ♂♂ (sl 8.2, 14.2 mm), NSMT-Cr 17170; WA06-F750, 4 ♂♂ (sl 5.1–8.0 mm), 1 ovig. ♀ (sl 5.4 mm), NSMT-Cr 17160; WA06-FG410, 5 ♂♂ (sl 4.2–8.1 mm), 1 ♂ with rhizocepharan parasite (sl 7.9 mm), 3 ovig. ♀♀ (sl 5.1–7.2 mm), 2 ♀♀ (sl 5.3, 7.0 mm), NSMT-Cr 17570; WA06-FG425, 1 ♂ (sl 6.5 mm), 1 ovig. ♀ (sl 6.1 mm), NSMT-Cr 17571; WA06-FG450, 1 ♂ (sl 9.1 mm), 1 ♀ with rhizocepharan parasite (sl 6.8 mm), NSMT-Cr 17183; WA06-FG450, 1 ♂ (sl 9.4 mm), NSMT-Cr 17572; WA06-FG480, 6 ♂♂ (sl 5.6–7.2 mm), 1 ovig. ♀ (sl 8.4 mm), 2 ♀♀ (sl 6.6, 6.6 mm), NSMT-Cr 17150; WA06-FG510, 4 ♂♂ (sl 9.0–12.8 mm), 1 ovig. ♀ (sl 7.2 mm), NSMT-Cr 17149; WA06-FG510, 1 ♂ (sl 5.2 mm), NSMT-Cr 17573; WA06-G380, 2 ♂♂ (sl 10.7, 15.0 mm), NSMT-Cr 17154; WA06-G425, 2 ♂♂ (sl 6.7, 7.8 mm), 1 ovig. ♀ (sl 6.8 mm), NSMT-Cr 17179; WA06-G425, 1 ovig. ♀ (sl 8.6 mm), NSMT-Cr 17574; WA06-G450, 1 ♂ (sl 15.2 mm), 1 ♂ with rhizocepharan parasite (sl 6.7 mm), 1 ♀ with rhizocepharan parasite (sl 7.6 mm), NSMT-Cr 17158; WA06-G450, 4 ♂♂ (sl 7.3–15.3 mm), NSMT-Cr 17162; WA06-G480, 3 ♂♂ (sl 4.3–14.0 mm), 2 ovig. ♀♀ (sl 10.4, 10.7 mm), NSMT-Cr 17152; WA06-G510, 2 ♂♂ (sl 4.7, 13.3 mm), NSMT-Cr 17155; WA06-G550, 2 ♂♂ (sl 11.5, 13.5 mm), 1 ovig. ♀ (sl 9.7 mm), NSMT-Cr 17174; WA06-G650, 1 ♀ (sl 8.0 mm), NSMT-Cr 17168; WA06-G750, 1 ♂ (sl 6.4 mm), NSMT-Cr 17176; WA06-G900, 1 ♂ (sl 7.2 mm), NSMT-Cr 17178; WA06-GH450, 1 ♀ (sl 5.2 mm), NSMT-Cr 17556; WA06-GH480D, 1 ♂ (sl 3.7 mm), NSMT-Cr 17177; WA06-GH510, 1 ♂ with rhizocepharan parasite (sl 6.7 mm), 1 ♀ (sl 4.1 mm), NSMT-Cr 17182; WA06-H350, 1 ♂ (sl 6.6 mm), NSMT-Cr 17575; WA06-H380, 1 ♂ (sl 15.9 mm), NSMT-Cr 17148; WA06-H410, 5 ♂♂ (sl 15.1–16.0 mm), NSMT-Cr 17147; WA06-H480, 6 ♂♂ (sl 3.7–4.3 mm), 3 ♀♀ (sl 4.0–4.1 mm), 9 juvs. (sl 2.2–3.0 mm), NSMT-Cr 17576; WA06-H510, 1 juv. (sl 3.0 mm), NSMT-Cr 17577; WA07-A410, 2 ♂♂ (sl 11.1, 11.7 mm), 1 ovig. ♀ (sl 7.6 mm), NSMT-Cr 18896; WA07-A450, 2 ♂♂ (sl 5.3, 9.2 mm), 1 ovig. ♀ (sl 9.0 mm), NSMT-Cr 18897; WA07-A510, 1 ♂ (sl 13.0 mm), 1 ovig. ♀ (sl 8.9 mm), NSMT-Cr 18898; WA07-A550, 1 ♂ (sl 13.7 mm), NSMT-Cr 18899; WA07-A650, 1 ♂ (sl 14.0 mm), 1 ovig. ♀ (sl 7.3 mm), NSMT-Cr 18900; WA07-A750, 1 ♂ (sl 10.3 mm), NSMT-Cr 18901; WA07-B450, 2 ♂♂ (sl 8.1, 11.3 mm), 1 ovig. ♀ (sl 6.9 mm), NSMT-Cr 18902; WA07-B510, 1 ♂ (sl 10.0 mm), 1 ♀ (sl 7.1 mm), NSMT-Cr 18903; WA07-B550, 1 ♂ (sl 10.4 mm), 1 ovig. ♀ (sl 6.3 mm), NSMT-Cr 18904; WA07-B650, 1 ♂ (sl 13.9 mm), 1 ovig. ♀ (sl 7.8 mm), NSMT-Cr 18905; WA07-B750, 1 ♂ (sl 12.8 mm), 1 ♀ (sl 7.0 mm), NSMT-Cr 18906; WA07-C450, 1 ♂ (sl 9.7 mm), 1 ♀ (sl 7.7 mm), 1 ♀ with rhizocepharan parasite (sl 7.2 mm), NSMT-Cr 18907; WA07-C510, 1 ♂ (sl 11.8 mm), 1 ♀ (sl 6.2 mm), NSMT-Cr 18908; WA07-C550, 1 ovig. ♀ (sl 7.6 mm), 1 ♀ (sl 6.5 mm), NSMT-Cr 18909; WA07-C650, 1 ♂ (sl 10.8 mm), 1 ovig. ♀ (sl 6.9 mm), NSMT-Cr 18910; WA07-C750, 1 ♂ (sl 12.7 mm), 1 ♀ (sl 8.1 mm), NSMT-Cr 18911; WA07-D410, 1 ♀

(sl 5.5 mm), 1 damaged, NSMT-Cr 18912; WA07-D450, 2 ♂♂ (sl 7.5, 8.7 mm), 1 ♀ (sl 5.0 mm), NSMT-Cr 18913; WA07-D510, 1 ♂ (sl 10.0 mm), 1 ♀ (sl 5.4 mm), NSMT-Cr 18914; WA07-D550, 1 ♂ (sl 8.5 mm), 1 ♀ (sl 8.8 mm), NSMT-Cr 18915; WA07-D650, 1 ♂ (sl 12.6 mm), 2 ♀♀ (sl 5.6, 11.2 mm), NSMT-Cr 18916; WA07-D750, 1 ♂ (sl 12.0 mm), 2 ovig. ♀♀ (sl 6.1, 7.0 mm), NSMT-Cr 18917; WA07-D900, 3 ♂♂ (sl 4.1–6.1 mm), 1 ovig. ♀ (sl 7.0 mm), NSMT-Cr 18918.

Remarks. This species is the most abundant among deep-sea hermit crabs in this area, occurring at the depths of 310–1031 m (mainly 400–750 m).

Distribution. Aleutian Islands, Alaska, northern Japan from Hokkaido to northeastern Honshu, 310–1143 m (McLaughlin, 1974; Komai, 1993; Takeda, 1993; present study).

Pagurus trigonocheirus Stimpson, 1858
[Japanese name: Mitsukado-hon-yadokari]
(Fig. 2F)

Material examined. KT-07-29-H1, 1 ♂ (sl 10.5 mm), 1 ♂ with rhizocepharan parasites (sl 11.7 mm), 3 ovig. ♀♀ (sl 8.1–8.5 mm), NSMT-Cr 18976; WA05-DE250, 1 ovig. ♀ (sl 9.3 mm), NSMT-Cr 16986; WA05-DE380D, 1 ♂ (sl 12.8 mm), 4 ovig. ♀♀ (sl 8.6–10.3 mm), 1 ♀ (sl 7.1 mm), NSMT-Cr 16987; WA05-DE410, 3 ♂♂ (sl 6.4–9.0 mm), 1 ovig. ♀ (sl 7.6 mm), 1 ♀ (sl 5.1 mm), NSMT-Cr 16988; WA05-DE425, 1 ♂ (sl 8.8 mm), NSMT-Cr 18992; WA05-E410, 1 ♂ (sl 9.4 mm), 1 ovig. ♀ (sl 7.4 mm), 2 ♀♀ (sl 8.8–9.2 mm), 1 ♀ with rhizocepharan parasites (sl 9.9 mm), NSMT-Cr 16989; WA05-EF250D, 1 ovig. ♀ (sl 11.0 mm), NSMT-Cr 16990; WA05-EF350, 2 ♂♂ (sl 4.8, 7.6 mm), 1 ovig. ♀ (sl 7.4 mm), NSMT-Cr 16991; WA05-FG310, 2 ♂♂ (sl 4.6, 6.0 mm), 2 ♀♀ (sl 4.4, 5.4 mm), NSMT-Cr 16992; WA05-FG350, 2 ovig. ♀♀ (sl 6.1, 8.3 mm), NSMT-Cr 16993; WA05-FG380, 2 ovig. ♀♀ (sl 5.2, 5.8 mm), NSMT-Cr 16994; WA05-G250, 2 ♂♂ (sl 7.2, 11.6 mm), 1 ♂ with rhizocepharan parasites (sl 11.8 mm), 1 ovig. ♀ (sl 10.0 mm), 1 ♀ (sl 5.2 mm), NSMT-Cr 16995; WA05-GH350, 2 ♂♂ (sl 13.2, 14.6 mm), NSMT-Cr 16996; WA05-GH410, 1 ♂ (sl 6.7 mm), NSMT-Cr 16997; WA05-H380, 3 ♂♂ (sl 6.4–9.3 mm), 1 ♂ with rhizocepharan parasites (sl 4.2 mm), 1 ovig. ♀ (sl 8.0 mm), 3 ♀♀ (sl 6.7–7.2 mm), 1 ♀ with rhizocepharan parasites (sl 7.5 mm), NSMT-Cr 16998; WA06-A250D, 2 ♀♀ (sl 4.1, 4.4 mm), 2juv (sl 2.4, 3.2 mm), NSMT-Cr 17204; WA06-B310D, 5 ♂♂ (sl 3.5–9.1 mm), 1 ovig. ♀ (sl 5.5 mm), 9 ♀♀ (sl 3.0–7.8 mm), 1 juv. (sl 2.7 mm), NSMT-Cr 17209; WA06-B450, 1 ♂ (sl 6.9 mm), NSMT-Cr 17197; WA06-C310, 2 ♀♀ (sl 4.4, 5.8 mm), NSMT-Cr 17194; WA06-C350, 2 ♂♂ (sl 5.0, 6.8 mm), 1 ovig. ♀ (sl 6.9 mm), NSMT-Cr 17202; WA06-C350D, 1 ♂ (sl 8.4 mm), 1 ♀ (sl 4.6 mm), NSMT-Cr 17199; WA06-DE410, 1 ♂ (sl 5.0 mm), NSMT-Cr 17579; WA06-E210, 1 ♂ (sl 12.6 mm), 1 ♀ (sl 10.2 mm), NSMT-Cr 17190; WA06-E250, 1 ♂ (sl 11.1 mm), 1 ♀ (sl 7.5 mm), NSMT-Cr 17200; WA06-E280, 1 ♂ with rhizocepharan parasite (sl 12.8 mm), 1 ovig. ♀ (sl 13.3 mm), NSMT-Cr 17205; WA06-E310, 1 ♂ with rhizocepharan parasite (sl 13.0 mm), 1 ovig. ♀ (sl 11.1 mm), NSMT-Cr 17206; WA06-E380, 1 ovig. ♀ (sl 8.9 mm), 1 ♀ with rhizocepharan parasite (sl 6.1 mm), NSMT-Cr 17211; WA06-E410, 1 ♀ with rhizocepharan parasite (sl 11.2 mm), NSMT-Cr 17210; WA06-EF380, 1 ♂ (sl 2.7 mm), NSMT-Cr 17582; WA06-EF410, 1 juv. (sl 2.4 mm), NSMT-Cr 17583; WA06-EF425, 1 ♀ (sl 4.4 mm), NSMT-Cr 17584; WA06-F210, 1 ♂ (sl 12.6 mm), 1 ♀ (sl 7.5 mm), NSMT-Cr 17188; WA06-F250, 1 ♂ (sl 5.2 mm), 1 ♀ with rhizocepharan parasite (sl 9.5 mm), NSMT-Cr 17187; WA06-F310, 2 ♂♂ (sl 12.4, 12.9 mm), NSMT-Cr 17192; WA06-F350, 1 ♂ (sl 11.7 mm), 1 ♂ with rhizocepharan parasite (sl 12.3 mm), NSMT-Cr 17207; WA06-F380, 1 ♂ (sl 11.8 mm), 2 ovig. ♀♀ (sl 6.0, 9.0 mm), NSMT-Cr 17203; WA06-F410, 1 ♀ (sl 7.0 mm), NSMT-Cr 17196; WA06-F425, 1 ♂ (sl 9.3 mm), 1 ♀ (sl 9.5 mm), NSMT-Cr 17189; WA06-FG310, 1 ♂ (sl 4.1 mm), 1 ♀ (sl 5.6 mm), NSMT-Cr 18996; WA06-FG410, 2 ♂♂ (sl 4.9, 8.0 mm), 1 ♀ (sl 4.0 mm), NSMT-Cr 17580; WA06-FG425, 1 ♀ (sl 5.5 mm), NSMT-Cr 17195; WA06-G280, 1 ♂

(sl 15.4 mm), NSMT-Cr 17186; WA06-G310, 2 ♂♂ (sl 12.6, 15.2 mm), 1 ♀ (sl 10.5 mm), NSMT-Cr 17201; WA06-G350, 2 ♂♂ (sl 12.6, 14.4 mm), NSMT-Cr 17191; WA06-G380, 2 ♂♂ (sl 12.3, 14.6 mm), 1 ♂ with rhizocepharan parasite (sl 11.9 mm), NSMT-Cr 17208; WA06-G425, 2 ♂♂ (sl 11.2, 11.2 mm), NSMT-Cr 17193; WA06-G450, 1 ♂ (sl 7.8 mm), NSMT-Cr 17198; WA06-GH280, 1 ovig. ♀, NSMT-Cr 17230; WA06-GH425, 1 ♂ (sl 3.0 mm), NSMT-Cr 17581; WA07-A250, 1 ♂ (sl 10.3 mm), NSMT-Cr 18877; WA07-A250D, 1 ♀ with rhizocepharan parasites (sl 4.7 mm), 2 juvs (sl 1.3, 2.9 mm), NSMT-Cr 18878; WA07-A310, 3 ♀♀ (sl 5.1–7.8 mm), NSMT-Cr 18879; WA07-A350, 2 ♂♂ (sl 7.0, 7.9 mm), 1 ♂ with rhizocepharan parasites (sl 9.0 mm), 1 ♀ (sl 9.2 mm), NSMT-Cr 18880; WA07-A410, 2 ♂ (sl 8.4, 10.5 mm), NSMT-Cr 18881; WA07-B250, 2 ♂ (sl 5.9, 6.7 mm), 1 juv. (sl 3.3 mm), NSMT-Cr 18882; WA07-B350, 2 ♂♂ (sl 5.4, 12.3 mm), 1 ♂ with rhizocepharan parasites (sl 7.4 mm), 1 ♀ with rhizocepharan parasites (sl 11.5 mm), NSMT-Cr 18883; WA07-B410, 4 ♂♂ (sl 5.7–8.8 mm), 1 ♂ with rhizocepharan parasite (sl 5.8 mm), 2 ♀♀ (sl 4.1, 4.9 mm), 1 ♀ with rhizocepharan parasites (sl 5.6 mm), NSMT-Cr 18884; WA07-B410D, 2 ♀♀ (sl 3.5, 3.8 mm), NSMT-Cr 18885; WA07-B450, 1 ♂ (sl 7.0 mm), 1 ovig. ♀ (sl6.6 mm), NSMT-Cr 18886; WA07-C210, 1 ♀ (sl 9.3 mm), NSMT-Cr 18887; WA07-C310, 1 ♂ (sl 7.9 mm), 1 ovig. ♀ (sl 6.4 mm), NSMT-Cr 18888; WA07-C350, 2 ♂♂ (sl 4.6, 10.7 mm), 1 ♂ with rhizocepharan parasites (sl 7.7 mm), 1 ♀ with rhizocepharan parasites (sl 7.2 mm), NSMT-Cr 18889; WA07-C350D, 5 ♂♂ (sl 3.3–9.8 mm), 2 ovig. ♀ (sl 5.6, 5.8 mm), 6 ♀♀ (sl 2.4–6.4 mm), 1 ♀ with rhizocepharan parasites (sl 7.1 mm), 33 juvs (sl 1.3–2.5 mm), NSMT-Cr 18890; WA07-C410, 1 ♂ (sl 12.7 mm), 1 ovig. ♀ (sl 5.3 mm), 1 ♀ 5.5 mm), NSMT-Cr 18891; WA07-C450, 1 ♂ (sl 6.0 mm), 1 ♀ (sl 7.1 mm), NSMT-Cr 18892; WA07-D310, 1 ♂ (sl 12.9 mm), 1 ♂ with rhizocepharan parasites (sl 10.1 mm), 1 ovig. ♀ (sl 12.9 mm), NSMT-Cr 18893; WA07-D350, 1 ♂ (sl 15.3 mm), 1 ovig. ♀ (sl 8.3 mm), NSMT-Cr 18894; WA07-D410, 1 ♂ (sl 9.3 mm), 1 ovig. ♀ (sl 7.8 mm), 1 juv. (sl 2.6 mm), NSMT-Cr 18895.

Remarks. This species is the most abundant hermit crab at the depths of 208–497 m (mainly 250–400 m) in the surveyed area. The present material extends the bathymetrical range of this species to 497 m.

Pagurus trigonocheirus and *P. townsendi* are superficially similar in morphology. Komai (1993) suspected that specimens referred to *P. trigonocheirus* by Yokoya (1933; as *Eupagurus*) might be partially referred to *P. townsendi*, because three lots from northeastern Honshu came from greater depths (station 18, 583 m; station 60, 477 m; and station 73, 390 m) for *P. trigonocheirus*. The present extensive material shows that *P. trigonocheirus* does not occur at depths greater than 500 m, and based on this, it can be assume that at least the single female collected at the depth of 583 m represented *P. townsendi*.

Distribution. Sea of Japan, northeastern Honshu, Hokkaido, Sea of Okhotsk, Kurile Islands to Kamchatka, Bering Sea to Arctic Ocean, Pacific coast of northeastern Japan, Sea of Okhotsk, Kuril Islands, Kamchatka, Bering Sea, Chukuchi Sea, Arctic Sea, subtidal to 497 m (McLaughlin, 1974; Asakura, 2006a; present study).

Family Parapaguridae

Parapagurus benedicti de Saint Laurent, 1972

[Japanese name: Kita-shinkai-yadokari]

(Fig. 2G)

Parapagurus pilosimanus benedicti de Saint Laurent, 1972: 103, pl. 1, fig. 6; McLauchlin, 1974: 371, figs. 100–101; Hart, 1982: 108, fig. 38.

Parapagurus benedicti: Lemaitre, 1989: 11; Lemaitre, 1999: 324, figs. 12–15, 47, 50; Asakura, 2006b: 313, figs. 3–4.

Material examined. KT-07-29-E1, 12 young ♂♂ (sl 2.8–4.0 mm), 10 young ♀♀ (sl 2.8–4.2

mm), 1 postlarva (sl 2.2 mm), NSMT-Cr 18979; KT-07-29-E3, 1 ♂ (sl 9.3 mm), 1 young ♂ (sl 2.9 mm), 1 young ♀ (sl 2.8 mm), NSMT-Cr 18980; KT-07-29-H2, 1 young ♂ (sl 3.5 mm), 1 ovig. ♀ (sl 6.4 mm), NSMT-Cr 18981; KT-07-29-H2, 1 postlarva (sl 2.4 mm), NSMT-Cr 18982; KT-07-29-K1, 2 ovig. ♀♀ (sl 5.7, 6.0 mm), NSMT-Cr 18983; KT-07-29-K2, 4 ♂♂ (sl 4.8–7.2 mm), 1 young ♂ (sl 3.5 mm), 1 ovig. ♀ (sl 6.9 mm), 3 ♀♀ (sl 4.2–4.9 mm), NSMT-Cr 18984; KT-07-29-K3, 7 ♂♂ (sl 4.5–7.4 mm), 2 ♂ with rhizocepharan parasite (sl 4.6, 6.8 mm), 1 young ♂ (sl 4.0 mm), 6 ovig. ♀♀ (sl 5.2–5.7mm), 7 ♀♀ (sl 4.4–5.4 mm), 3 ♀♀ with rhizocepharan parasite (sl 5.1–5.6 mm), NSMT-Cr 18985; KT-07-29-K3, 1 postlarva (sl 2.7 mm), NSMT-Cr 18986; KT-07-29-M2, 2 ♂♂ (sl 3.6, 6.3 mm), 1 ♀ (sl 5.1 mm), NSMT-Cr 18987; WA06-F1500D-1, 1 ♀ with rhizocepharan parasite (sl 3.5 mm), NSMT-Cr 17144; WA06-G1200, 1 ♂ (sl 4.6 mm), NSMT-Cr 17633; WA95-B1300, 2 ♂♂ (sl 9.5, 9.7 mm), NSMT-Cr 18961; WA95-B2000, 1 ♂ (sl 9.7 mm), NSMT-Cr 18962; WA95-D2000, 2 ♂♂ (sl 11.6, 13.3 mm), NSMT-Cr 18963.

Coloration. Adult: Shield white. Ocular peduncle orange; cornea black. Antennule and antenna orange. Chelipedal merus orange; carpus, propodus, and dactylus white. Ambulatory legs orange. Abdomen pale orange.

Post larva: Whole body generally orange-red. Ocular peduncle white with orange lateral margin; cornea black in proximal 0.7, transparent in distal 0.3. Antennule white.

Remarks. Lemaitre (1999) suspected that previous records of *Parapagurus pilosimanus* from various localities east of Kamchatka and the Kurile Islands in the northwestern North Pacific (e. g., Makarov, 1938, 1962; Vinogradov, 1950; Birshtein and Vinogradov, 1951; Kobjakova, 1958; Birshtein and Zarenkov, 1970) might be referred to *P. benedicti*, instead of the true *P. pilosimanus* Smith, 1879. Recently Asakura (2006b) recorded this species from Japanese waters for the first time based on a single specimen from off Sanriku coast, northeastern Honshu, at the depth of 2350 m. Now it is revealed that this species is common in northern Japan at depths greater than 1000 m, fully supporting Lemaitre's (1999) suspicion.

Distribution. Widespread in the North Pacific, from northern Japan to Baja California, 757–2400 m deep (Lemaitre, 1999; Asakura, 2006b).

Infraorder Brachyura
Family Cancridae
Cancer gibbosulus de Haan, 1833
[Japanese name: Ibo-icho-gani]
(Fig. 3C)

Material examined. WA05-H150, 1 ♀ (cb 12.4 mm), NSMT-Cr 17071; WA06-A150, 1 ♂ (cb 35.4 mm), 1 ♀ (cb 24.0 mm), NSMT-Cr 17120; WA06-A150D, 4 ♂♂ (cb 15.1–31.3 mm), 2 ♀♀ (cb 15.0, 19.2 mm), NSMT-Cr 17121; WA06-B150, 3 ♂♂ (cb 20.8–26.0 mm), 2 ♀♀ (cb 18.9–21.0 mm), NSMT-Cr 17122; WA06-E150, 1 ♀ (cb 40.4 mm), NSMT-Cr 17119; WA07-A150, 1 ♂ (cb 33.8 mm), 2 ♀♀ (cb 30.7, 32.2 mm), NSMT-Cr 18956; WA07-B150, 1 ♂ (cb 25.6 mm), NSMT-Cr 18957; WA9302-K02, 2 ♂♂ (cb 9.7, 14.9 mm), NSMT-Cr 17631.

Distribution. Japan, Korea, China, 30–156m deep (Sakai, 1976; present study).

Family Cheiragonidae
Erimacrus isenbeckii (Brandt, 1848)
[Japanese name: Ke-gani]
(Fig. 3D)

Material examined. SO-07-C8, 1 ♂ (cb 50.6 mm), 1 ♀ (cb 58.8 mm), NSMT-Cr 18991;

WA05-G210, 1 juv. (cb 7.3 mm), NSMT-Cr 17070; WA06-G310, 1 ♀ (cb 68.4 mm), NSMT-Cr 17132; WA07-A250D, 4 juvs. (cb 5.6–5.9 mm), NSMT-Cr 18946; WA07-B150, 1 young ♂ (cb 9.1 mm), NSMT-Cr 18947; WA07-B210, 1 young ♀ (cb 16.0 mm), NSMT-Cr 18948; WA07-B250, 1 young ♀ (cb 16.3 mm), NSMT-Cr 18949; WA07-B310, 4 juvs. (cb 5.0–8.2 mm), NSMT-Cr 18950; WA07-D210D, 1 juv. (cb 7.7 mm), NSMT-Cr 18951; WA9204-K4-4, 10 young ♂♂ (cb 10.9–37.3 mm), 5 young ♀♀ (cb 10.6–16.2 mm), NSMT-Cr 17622; WA9302-K02, 2 young ♂♂ (cb 13.1, 15.6 mm), NSMT-Cr 17623; WA9303-K14, 1 young ♀ (cb 18.1 mm), NSMT-Cr 17624.

Distribution. Japan (Hokkaido, Sea of Japan coast southward to Tottori Prefecture, Pacific coast southward to Choshi, Chiba Prefecture), north coast of Korea, Kamchatka, Sea of Okhotsk, Kuril Islands, Aleutian Islands eastward to Unalaska, 10–315 m deep (Sakai, 1976; present study).

Family Corystidae

Podocatactes hamifer Ortmnann, 1894

[Japanese name: Toge-hige-gani]

(Fig. 3E)

Material examined. WA06-G150, 1 ♀ with rhizocepharan parasite (cb 8.9 mm), NSMT-Cr 17130.

Distribution. Known only from Japan except Hokkaido, 45–476 m deep (Takeda, 2001).

Family Cyclodorippidae

Tymolus japonicus Stimpson, 1858

[Japanese name: Mame-heike-gani]

Material examined. WA9303-K12, 1 young ♀ (cb 7.1 mm), NSMT-Cr 17625; WA06-A150D, abnormal 1 ♀ (cb 9.2 mm), NSMT-Cr 17129.

Distribution. Taiwan and Japanese waters from Hakodate, southern Hokkaido, to Kyushu along both coasts, 15–600 m deep (Takeda, 2001; Ho *et al.*, 2004).

Tymolus uncifer (Ortmann, 1892)

[Japanese name: Ashinaga-mame-heike-gani]

(Fig. 3F)

Material examined. WA06-D210D, 2 young ♀♀ (cb 3.4, 4.2 mm), NSMT-Cr 17127; WA06-G150, 1 ♂ (cb 6.6 mm), NSMT-Cr 17126.

Distribution. East Africa, Andaman Sea, Japan (northern Honshu to Kyushu along both coasts), 55–741 m deep (Takeda, 2001).

Family Ethusidae

Ethusina wakataka sp. nov.

[New Japanese name: Wakataka-shinkai-heike-gani]

(Figs. 4–5)

Material examined. Holotype, male (cb 9.0 x cl 9.1 mm), NSMT-Cr 17128, WA06-F1500D-2, off Soma, Fukushima Pref., northeastern Japan, 37˚38.92′N, 142˚34.09′E–37˚39.39′N, 142˚34.32′E, 1466–1471 m, 1 Nov. 2006, dredge, coll. H. Komatsu.

Fig. 4. *Ethusina wakataka* sp. nov. Holotype, male (cb 9.0 x cl 9.1 mm; NSMT-Cr 17128) from off Soma, Fukushima Prefecture, Japan. Scales 5 mm.

Description. Carapace (Fig. 4) almost as long as broad; dorsal surface covered with small, conspicuous granules except frontal teeth, without setae. Mesogastric, urogastric, cardiac regions weakly elevated and bordered by inconspicuous lateral borders; cervical groove shallow, inconspicuous; branchial grooves conspicuous. Branchial regions conspicuously inflated along sides.

Anterior border of carapace (Fig. 4) with very slender, outwardly directed, acutely tipped outer orbital teeth, twice as long as lateral frontal teeth measured along inner margin, but not reaching to level of tips of lateral frontal teeth. Lateral frontal teeth slender, acutely tipped, not

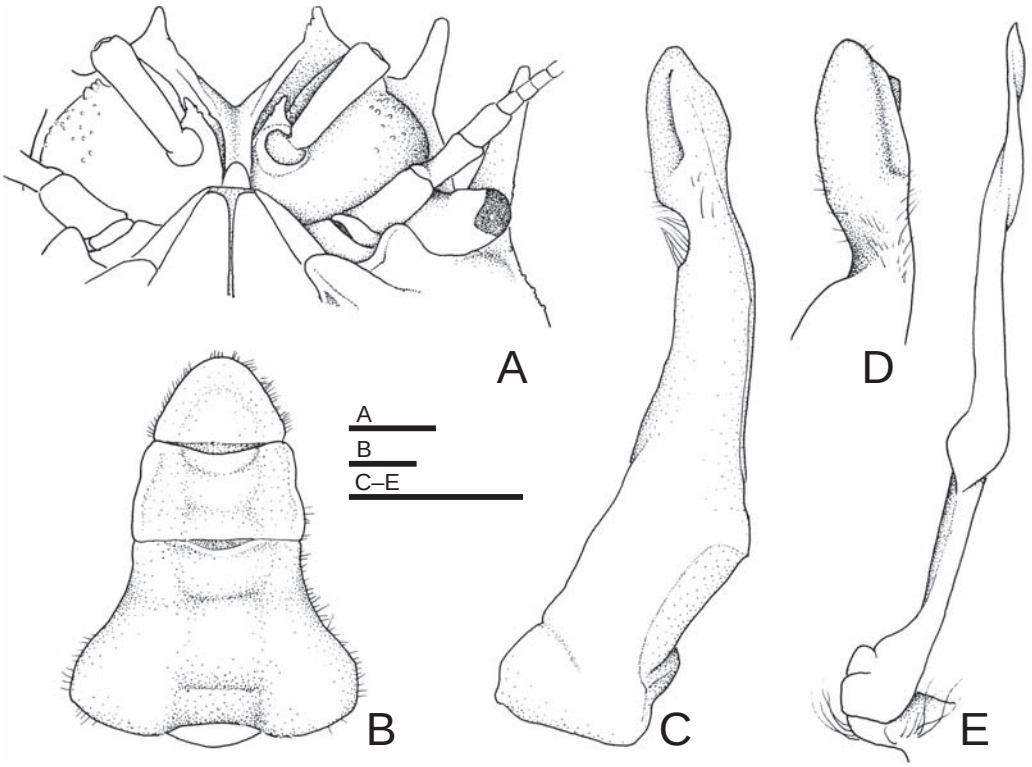

Fig. 5. *Ethusina wakataka* sp. nov. Holotype, male (cb 9.0 x cl 9.1 mm; NSMT-Cr 17128) from off Soma, Fukushima Prefecture, Japan. A, frontal region, ventral view; B, abdomen, ventral view; C, male first gonopod, ventral view; D, tip of same, lateral view; E, male second gonopod, ventral view. Scales 1 mm.

reaching triangular, median frontal teeth. Orbital sinuses narrow, V-shaped; inner margin weakly convex inward, outer margin almost straight; lateral frontal sinuses broad, V-shaped with rounded bottom, asymmetrical; median frontal sinus broad, V-shaped, 1.2 times and 1.6 times broader than lateral frontal and orbital sinuses, respectively.

Anterior border of endostome (Fig. 5A) strongly projecting anteriorly beyond posterior border of antennular fossae.

Eye peduncles (Fig. 5A) immovable, wide, longer than cornea, 2.0 times eye diameter, partially visible through orbital sinuses in dorsal view.

Third maxilliped finely granular, without setae; basis fused with ischium, but divided from ischium by shallow groove; ischium with shallow, submedian groove; merus weakly convex along midline; palp with sparse setae; exopod very narrow, with 2-segmented flagellum.

Male right cheliped (Fig. 4; left cheliped lost, females unknown) smooth, 1.6 times as long as carapace; merus subcylindrical; carpus and palm swollen; fingers 1.3 times longer than palm, blunt on cutting edges.

P2–3 (Fig. 4) slender, elongate, granular on ventral surfaces of meri; meri, carpi, and propodi subcylindrical; dactyli compressed; P2 3.3 times as long as carapace, P2 meri 8.3 times longer than broad; P3 3.0 times as long as carapace, P3 meri 7.5 longer than broad. P4–5 almost same in shape and length, 1.4 times as long as carapace, entirely covered with sparse, short setae.

Male abdomen (Fig. 5B) fringed with short setae; first and second segments transversely rectangular, visible in dorsal view, first segment twice as long as second one; third to fifth segments fused together, trapezoidal, segments divided by weak depression; sixth segments movable, trans-

versely rectangular; telson triangular with rounded tip.

G1 (Fig. 5C–D) stout, constricted at distal 0.3 with short setae, carinated on distal 0.2 of midline with slight, distal aperture where tip of G2 protruded. G2 (Fig. 5E) very slender, as long as G1, spiral in distal 0.3.

Color in life. Body entirely white; fingers of chelae and dactyli of P2 and P3 with tinge of pink.

Distribution. Known only from off Soma, Fukushima Prefecture, northeastern Japan, at depths of 1466–1471 m.

Remarks. Ethusina wakataka sp. nov. appears closest to *E. taiwanensis* Ng and Ho, 2003, known from Japan and Taiwan, *E. huilianae* Castro, 2005, presently known only from French Polynesia, and *E. rowdeni* Ahyong, 2008, known only from Kermadec Ridge, New Zealand (cf. Ng and Ho, 2003; Castro, 2005; Ahyong, 2008). Particularly the configuration of the anterior border of the carapace, including the frontal and outer orbital teeth, is similar among the four species. Nevertheless, the new species is distinctive in the unique structure of the G1 and G2. In the new species, the G1 is relatively stout, and markedly constricted at about the distal 0.25; in other three species, the G1 is less stout, and there is no subdistal constriction. Furthremore, in *E. taiwanensis*, the G1 is armed subterminally with a prominent, subdistal projection on the mesial margin (Ng and Ho, 2003: fig. 3G–H); in *E. huilianae*, the G1 rather abruptly tapers in a slender distal projection (Castro, 2005: fig. 30C); in *E. rowdeni*, the G1 somewhat tapers distally at the midlength, with a obliquely truncate terminal margin (Ahyong, 2008). The distal part of the G2 is spiral in *E. wakataka*, whereas it is straight in other three species. Furthermore, the orbital sinus is more narrowly incised in the new species than in the other three species. The branchial grooves on the carapace are clearly delimited in *E. watakata*, whereas they are less clear in the other three species.

From Japanese waters, there are several records of species of *Ethusina*. Miers (1886) described *E. challengeri* based on a single female specimen from off Boso Peninsula. Nagai and Tsuchida (1989) recorded *E. robusta* (Miers, 1886) from the Kumano Basin. Marumura and Kosaka (2003) listed five species of *Ethusina*, *E. desciscens* Alcock, 1896, *E. gracilipes* (Miers, 1886), *E. robusta*, and two unidentified species. Castro (2005) revised the genus, and recognized with certainty only two species from Japanese waters, i.e., *E. challengeri* and *E. taiwanensis*, because the material used by Nagai and Tsuchida (1989) or Marumura and Kosaka (2003) was not available to him. The identities of the taxa reported by Marumura and Kosaka (2003) need to be verified. The new species is the third of *Ethusina* known with certainty from Japan. It is readily distinguished from *E. challengeri* by the long outer orbital tooth, which shows as a rounded tubercle in *E. challengeri*.

Etymology. Named after R/V *Wakataka-maru* of the FRA; used a noun in apposition.

Family Latreilliidae

Eplumula phalangium (de Haan, 1839)

[Japanese name: Mizuhiki-gani]

Material examined. WA9201-K6-2, 1 ♂ (cb 8.3 mm), NSMT-Cr 17626.

Distribution. Japanese Archipelago southward from Tsugaru Strait, southern Korea, East China Sea, Taiwan, 30–307 m deep (Takeda, 2001; Castro *et al.*, 2003).

Family Epialtidae
Chorilia japonica Miers, 1879
[Japanese name: Kotsuno-gani]
(Fig. 3H)

Material examined. SO-07-C8, 1 ♂ (cb 22.9 mm), 1 ♀ (cb 20.3 mm), NSMT-Cr 18990; WA05-DE410, 1 ovig. ♀ (cb 18.4 mm), NSMT-Cr 17056; WA05-FG310, 1 ♂ (cb 11.5 mm), 1 young ♀ (cb 8.7 mm), NSMT-Cr 17057; WA05-FG350, 1 ♂ (cb 11.3 mm), NSMT-Cr 17058; WA05-FG480, 2 young ♀♀ (cb 9.0, 16.4 mm), NSMT-Cr 17059; WA05-G280, 1 ♂ (cb 14.5 mm), NSMT-Cr 17060; WA05-G350, 2 ♂♂ (cb 10.9, 19.5 mm), NSMT-Cr 17061; WA05-GH250, 4 ♂♂ (cb 18.6–21.2 mm), 2 ♀♀ (cb 11.8, 19.9 mm), NSMT-Cr 17062; WA05-GH310, 3 ♂♂ (cb 12.3–19.7 mm), 5 ♀♀ (cb 14.0–20.0 mm), NSMT-Cr 17063; WA05-GH380, 2 ♂♂ (cb 9.5, 16.7 mm), NSMT-Cr 17064; WA05-GH425, 1 young ♀ (cb 7.9 mm), NSMT-Cr 17065; WA05-GH480, 1ovig♀ (cb 19.8 mm), NSMT-Cr 17066; WA05-GH510, 1 ♂ (cb 9.7 mm), NSMT-Cr 17067; WA05-H280, 2 ♂♂ (cb 16.4, 17.9 mm), 2 ♀♀ (cb 15.0, 23.3 mm), NSMT-Cr 17068; WA05-H310, 1 ♀ (cb 17.1 mm), NSMT-Cr 17069; WA06-A250, 1 ♂ (cb 14.3 mm), NSMT-Cr 17082; WA06-A250D, 1 young ♀ (cb 12.8 mm), NSMT-Cr 17093; WA06-C350D, 1 ♂ (cb 14.1 mm), NSMT-Cr 17092; WA06-D1500, 1 ♀ (cb 20.5 mm), NSMT-Cr 17078; WA06-D210D, 1 young ♂ (cb 4.8 mm), 1 young ♀ (cb 6.9 mm), NSMT-Cr 17096; WA06-E150, 1 ♂ (cb 15.1 mm), NSMT-Cr 17080; WA06-E210, 3 ♀♀ (cb 16.6, 22.8 mm), 1 young ♀ (cb 13.9 mm), NSMT-Cr 17073; WA06-EF380, 1 ♂ (cb 20.8 mm), NSMT-Cr 17083; WA06-F210, 1 ♀ (cb 20.3 mm), NSMT-Cr 17075; WA06-F250, 1 ♂ (cb 22.0 mm), NSMT-Cr 17076; WA06-FG410, 1 ♂ (cb 10.3 mm), NSMT-Cr 17563; WA06-FG425, 1 ♂ (cb 14.1 mm), 1 ♀ (cb 21.2 mm), 1 young ♀ (cb 15.0 mm), NSMT-Cr 17085; WA06-FG425, 1 young ♀ (cb 11.5 mm), NSMT-Cr 17562; WA06-FG450, 1 young ♀ (cb 10.5 mm), NSMT-Cr 17089; WA06-FG480, 1 young ♀ (cb 16.3 mm), NSMT-Cr 17087; WA06-G150, 2 ♂♂ (cb 19.8, 28.5 mm), 1 ♀ (cb 16.0 mm), 1 young ♀ (cb 8.1 mm), NSMT-Cr 17072; WA06-G210, 2 ♂♂ (cb 16.6, 18.5 mm), 1 young ♀ (cb 8.6 mm), NSMT-Cr 17079; WA06-G250, 1 young ♀ (cb 10.8 mm), NSMT-Cr 17097; WA06-G280, 1 ♀ (cb 28.3 mm), NSMT-Cr 17084; WA06-G310, 2 ♂♂ (cb 12.6, 12.8 mm), NSMT-Cr 17095; WA06-G380, 2 young ♀♀ (cb 11.8, 13.0 mm), NSMT-Cr 17091; WA06-G425, 1 ♂ (cb 14.4 mm), 3 ovig. ♀♀ (cb 18.5–21.1 mm), 1 ♀ (cb 21.3 mm), NSMT-Cr 17081; WA06-G450, 4 ♂♂ (cb 16.0–22.5 mm), NSMT-Cr 17074; WA06-G480, 1 ♂ (cb 17.9 mm), NSMT-Cr 17094; WA06-GH510, 1 young ♀ with a bopyrid parasite (cb 10.8 mm), NSMT-Cr 17086; WA06-H310, 1juv (cb 3.8 mm), NSMT-Cr 17090; WA06-H310, 4 ♂♂ (cb 11.2–17.7 mm), 1 ovig. ♀ (cb 16.1 mm), 3 ♀♀ (cb 14.7–17.9 mm), 3 young ♀♀ (cb 10.5–12.5 mm), NSMT-Cr 17098; WA06-H380, 2 ♂♂ (cb 20.1, 20.9 mm), 2 ovig. ♀♀ (cb 15.9, 17.4 mm), 1 ♀ (cb 18.0 mm), NSMT-Cr 17088; WA06-H450, 1 ovig. ♀ (cb 22.2 mm), NSMT-Cr 17077; WA07-A150, 1 ♀ (cb 20.6 mm), NSMT-Cr 18929; WA07-A210, 1 ♀ (cb 19.3 mm), NSMT-Cr 18930; WA07-B150, 2 ♂♂ (cb 12.3, 15.3 mm), 1 ♀ (cb 15.3 mm), 1 young ♀ (cb 15.4 mm), NSMT-Cr 18931; WA07-B250, 1 ♂ (cb 9.9 mm), NSMT-Cr 18932; WA07-B310, 3 ♂♂ (cb 15.2–24.4 mm), 1 ♀ (cb 22.2 mm), NSMT-Cr 18933; WA07-B410, 2 ♀♀ (cb 12.9, 24.0 mm), NSMT-Cr 18934; WA07-C250, 1 ♂ (cb 16.0 mm), NSMT-Cr 18935; WA07-C410, 1 ♂ (cb 14.9 mm), NSMT-Cr 18936; WA07-D210D, 1 ovig. ♀ (cb 17.9 mm), 1 juv. (cb 4.6 mm), NSMT-Cr 18937; WA07-E550, 1 ovig. ♀ (cb 25.8 mm), NSMT-Cr 18938; WA07-F250, 1 ♂ (cb 13.5 mm), 1 ♀ (cb 13.7 mm), NSMT-Cr 18939; WA07-G280, 1 ♀ (cb 20.4 mm), NSMT-Cr 18940.

Distribution. Known only from Japanese waters (northern Honshu to Suruga Bay and Tosa Bay), 85–595 m deep (Takeda, 2001).

Scyra compressipes Stimpson, 1857
[Japanese name: Hiratsuno-gani]

Material examined. WA06-A150D, 1 ovig. ♀ (cb 11.2 mm), 1 young ♀ (cb 6.3 mm), NSMT-Cr 17131; WA9202-K6-2, 1 ♂ (cb 17.7 mm), NSMT-Cr 17630.

Distribution. Restricted to East Asian waters, Pacific coast of Japan from southern Hokkaido to Sagami Bay, Sea of Japan to Yellow Sea; 10–260 m deep (Sakai, 1976; Ikeda, 1998).

Family Leucosiidae
Ebalia tuberculosa (A. Milne Edwards, 1873)
[Japanese name: Yamato-ebalia]

Material examined. WA06-A150D, 2 ♂♂ (cb 7.3, 7.5 mm), 2 ♀♀ (cb 7.3, 8.1 mm), NSMT-Cr 17124; WA06-H210, 1 ♂ (cb 6.9 mm), NSMT-Cr 17125; WA9303-K12, 1 ♂ (cb 8.9 mm), NSMT-Cr 17627.

Distribution. Widely distributed in Indo-West Pacific, 28–800 m deep (Takeda, 2001; Poore, 2004).

Family Oregoniidae
Chionoecetes angulatus Rathbun, 1924
[Japanese name: Toge-zuwai-gani]
(Fig. 6A)

Material examined. KT-07-29-E1, 1 young ♂ (cb 11.3 mm), 2 young ♀♀ (cb 11.2, 11.3 mm), NSMT-Cr 18968; KT-07-29-E3, 1 ♂ (cb 88.1 mm), NSMT-Cr 18966; KT-07-29-K1, 1 young ♂ (cb 10.5 mm), 1 young ♀ (cb 22.9 mm), 3 juvs. (cb 3.6–3.7 mm), NSMT-Cr 18969; KT-07-29-K2, 1 young ♀ (cb 15.5 mm), 3 juvs. (cb 3.7–3.8 mm), NSMT-Cr 18970; KT-07-29-K3, 5 young ♂♂ (cb 14.2–38.9 mm), 7 young ♀♀ (cb 13.7–26.4 mm), 4 juvs (cb 3.6–6.7 mm), NSMT-Cr 18967.

Remarks. In Japanese waters, this species has previously been recorded from off Matsushima, Miyagi Prefecture, at the depth of 120 m (Sakai, 1976) and off Kinkazan, Miyagi Prefecture, at the depths of 2034–2021 m (Takeda, 1995). During this study, no specimens of this species were collected from off northeastern Honshu, but several specimens from off eastern Hokkaido are available. The depth record of the present specimens ranges from 1008 to 2043 m, and it is strongly suggested that *Chionoecetes angulatus* normally inhabits the middle to lower bathyal zone deeper than 1000 m in this area.

Distribution. Known from Japan, Kamtchatka, Bering Sea, British Columbia to Oregon, 90–2972 m deep (Garth, 1958; Sakai, 1976).

Chionoecetes bairdi Rathbun, 1924
[Japanese name: Oh-zuwai-gani]
(Fig. 6B)

Material examined. WA07-C410, 1 ♂ (cb 73.0 x cl 62.8 mm), NSMT-Cr 18959.

Remarks. In Japan, this species has been recorded from waters around Hokkaido (Igarashi, 1970b; Takeda and Hayashi, 1990), but no definite records exceeding the depths of 200 m are available.

Distribution. Northern Japan including the Pacific coast of Hokkaido and northeastern

Honshu), Sea of Okhotsk, Kurile Islands, Bering Sea, British Columbia; shallow water to 466 m deep (Rathbun, 1925; Igarashi, 1970b; Takeda and Hayashi, 1990). The present record slightly extends the geographical distribution southward to off Miyako, Iwate Prefecture.

Chionoecetes japonicus Rathbun, 1932
[Japanese name: Beni-zuwai-gani]
(Fig. 6C)

Material examined. KT-07-29-M1, 3 juvs. (cb 3.4–3.6 mm), NSMT-Cr 18971; KT-07-29-M2, 27 juvs. (cb 3.3–3.7 mm), NSMT-Cr 18972; KT-07-29-M3-1, 1 juv. (cb 3.7 mm), NSMT-Cr 18973; KT-07-29-M3-2, 14 juvs. (cb 3.4–6.4 mm), NSMT-Cr 18974; KT-07-29-M3-3, 1 ♂ (cb 82.1 mm), NSMT-Cr 18965; SO-06-M1-B, 1 ♂ (cb 71.3 mm), 1 ovig. ♀ (cb 65.8 mm), NSMT-Cr 18989; WA05-E650, 1 young ♀ (cb 16.9 mm), NSMT-Cr 17046; WA05-F900, 1 young ♂ (cb 11.6 mm), NSMT-Cr 17047; WA05-G425, 1 young ♀ (cb 11.3 mm), NSMT-Cr 17048; WA05-G450, 1 young ♂ (cb 24.8 mm), 1 young ♀ (cb 21.1 mm), NSMT-Cr 17049; WA06-F1500D-1, 3 young ♂♂ (cb

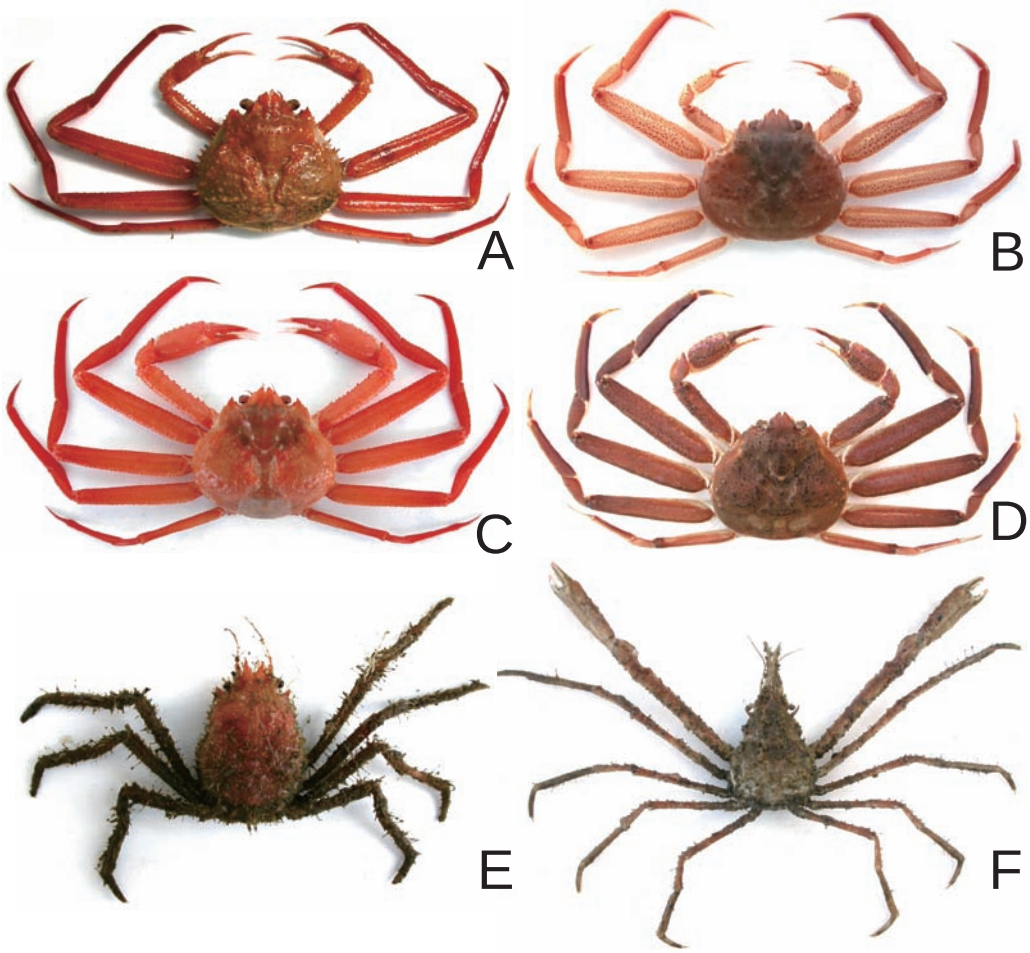

Fig. 6. A, *Chionoecetes angulatus* Rathbun, 1924; B, *Chionoecetes bairdi* Rathbun, 1924; C, *Chionoecetes japonicus* Rathbun, 1932; D, *Chionoecetes opilio* O. Fabricius, 1788; E, *Oregonia bifurca* Rathbun, 1902; F, *Oregonia gracilis* Dana, 1851.

6.4–10.5 mm), 1 young ♀ (cb 9.9 mm), NSMT-Cr 17110; WA06-F1500D-2, 1 young ♂ (cb 10.0 mm), 1 young ♀ (cb 10.5 mm), NSMT-Cr 17109; WA06-G480, 1 young ♂ (cb 13.4 mm), NSMT-Cr 17108; WA06-G650, 2 young ♂♂ (cb 15.7, 23.3 mm), 4 young ♀♀ (cb 16.4–25.1 mm), NSMT-Cr 17107; WA06-H1500D, 1 young ♂ (cb 9.8 mm), NSMT-Cr 17111; WA07-D900, 4 young ♂♂ (cb 10.6–13.9 mm), NSMT-Cr 18953; WA07-F450, 1 young ♂ (cb 14.8 mm), NSMT-Cr 18954; WA07-H1500, 1 young ♂ (cb 28.0 mm), NSMT-Cr 18955.

Distribution. Restricted to East Asian waters: Sea of Japan southward to off Matsue, Shimane Prefecture, Pacific coast of northern Japan southward to Sagami Bay, Sea of Okhotsk; 450–2500 m deep (Vinogradov, 1950; Sakai, 1976; Takeda and Miyauchi, 1992; Ikeda, 1998).

Chionoecetes opilio O. Fabricius, 1788
[Japanese name: Zuwai-gani]
(Fig. 6D)

Material examined. KT-07-29-H1, 1 ♂ (cb 35.4 mm), NSMT-Cr 18964; WA05-DE380D, 1 juv. (cb 4.7 mm), NSMT-Cr 17055; WA05-G450, 1 young ♂ (cb 13.7 mm), NSMT-Cr 17050; WA05-GH480, 1 young ♂ (cb 18.4 mm), NSMT-Cr 17051; WA06-B350, 1 young ♀ (cb 14.5 mm), NSMT-Cr 17101; WA06-C310, 1 young ♀ (cb 13.2 mm), NSMT-Cr 17103; WA06-C350D, 1 young ♀ (cb 9.9 mm), NSMT-Cr 17102; WA06-C450, 1 young ♂ (cb 9.7 mm), NSMT-Cr 17100; WA06-D210D, 5juv (cb 4.7–6.8 mm), NSMT-Cr 17105; WA06-G210, 1 young ♀ (cb 23.7 mm), NSMT-Cr 17106; WA06-G350, 1 young ♂ (cb 17.2 mm), 1 young ♀ (cb 17.4 mm), NSMT-Cr 17099; WA06-G425, 2 young ♀♀ (cb 19.7, 20.5 mm), NSMT-Cr 17104; WA07-B410, 1 young ♂ (cb 11.0 mm), NSMT-Cr 18952.

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]
(Fig. 3G)

Material examined. WA06-FG425, 1 ♂ (cb 20.5 mm), NSMT-Cr 17123; WA07-A350, 1 ♂ (cb 24.7 mm), NSMT-Cr 18958.

Distribution. East China Sea southward to Amoy, Sea of Japan, Pacific coast of northern Japan southward to Kinkazan, Sea of Okhotsk, Kuril Islands, Bering Sea, 30–200 m deep (Rathbun, 1925; Sakai, 1976). The present record extends the bathymetrical range to 426 m.

Oregonia bifurca Rathbun, 1902
[Japanese name: Futatsuno-kesen-gani]
(Fig. 6E, 7–8)

Oregonia bifurca Rathbun, 1902: 885; 1904: 171, pl. 6(5); 1925: 79, fig. 21, pls. 26–28; Garth, 1958: 140, pls. 1(1), 11(2); Sakai, 1978: 5, fig. 8; Takeda, 1987: 135 (in part); Marumura and Kosaka, 2003: 31, fig. 37.

Material examined. KT-07-29-K2, 1 ♂ (damaged), 1 ♀ (cb 20.0 x cl 25.0 mm), NSMT-Cr 18975; WA05-F1200, 1 ♂ (cb 26.6 x cl 33.3 mm), NSMT-Cr 17052.

Comparative material examined. Off Midway, 1 ♂ (cb 35.7 x cl 40.0 mm), NSMT-Cr 7329.

Remarks. The present specimens agree well with the descriptions and photographs of

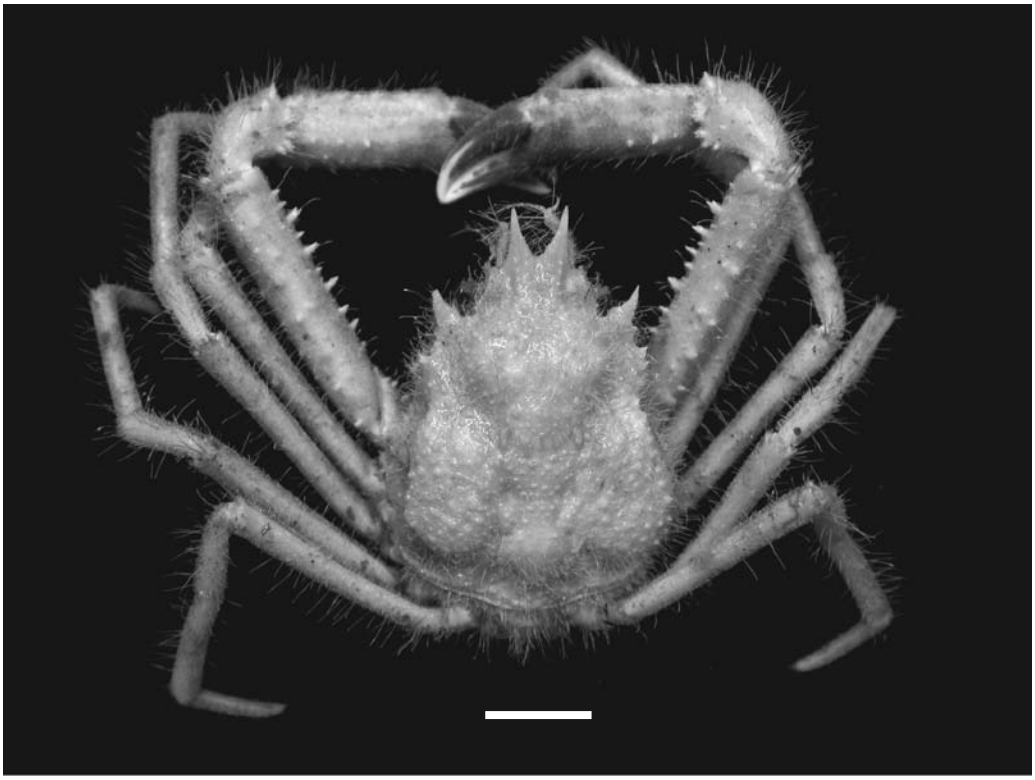

Fig. 7. *Oregonia bifurca* Rathbun, 1902. Male (cb 26.6 x cl 33.3 mm), NSMT-Cr 17052, from off Soma, Fukushima Prefecture, Japan. Scale 10 mm.

Oregonia bifurca provided by Rathbun (1925) and Garth (1958) except for the details of the male first gonopod. The first male gonopod of the larger specimen (Fig. 8A; NSMT-Cr 17052) differs from those of the male specimen from Midway (Fig. 8B; NSMT-Cr 7329) and illustration of Garth (1958) in the more compressed shaft and the distal part being more strongly curved medially. However, the gonopod of the smaller specimen (NSMT-Cr 18975) well agrees with those of Midway and Garth (1958). The morphological difference in the male gonopod may be caused from intraspecific variation or size.

In Japanese waters, Marumura and Kosaka (2003) has already recorded this species based on material from off Choshi at the depths of 200–300 m and thus our specimens represent the second record of this rare species from Japan. The present specimens extend the bathymetrical range of the species to 1543 m.

Distribution. Literature records suggest that this species is widely distributed in the North Pacific: Bering Sea (Rathbun, 1925), Nintoku Seamount of the Emperor Seamount (Sakai, 1978), north off Midway (Takeda, 1987), and the Pacific coast of northern Japan southward to Choshi, Chiba Prefecture (Marumura and Kosaka, 2003; this study); 200–1543 m.

Oregonia gracilis Dana, 1851
[Japanese name: Kesen-gani]
(Fig. 6F)

Material examined. WA05-DE250, 1 young ♀ (cb 12.6 mm), NSMT-Cr 17053; WA05-GH350, 1 ♂ (cb 9.7 mm), NSMT-Cr 17054; WA06-A150D, 1 young ♂ (cb 6.8 mm), NSMT-Cr

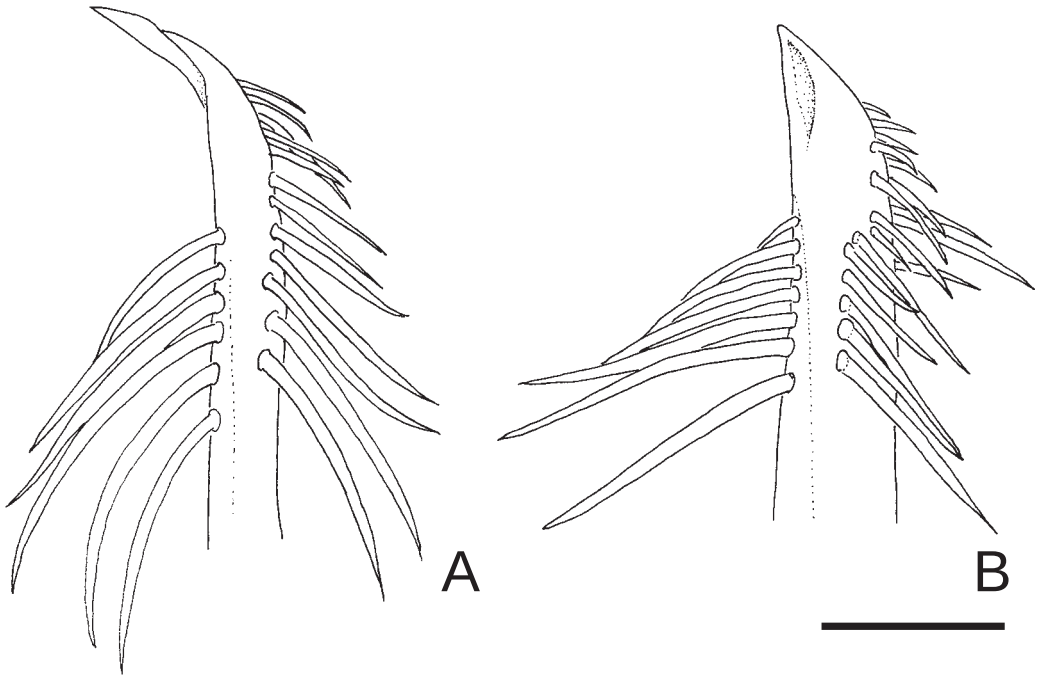

Fig. 8. *Oregonia bifurca* Rathbun, 1902. Tip of male first gonopod, sternal view. A, male (cb 26.6 x cl 33.3 mm), NSMT-Cr 17052, from off Soma, Fukushima Prefecture, Japan; B, male (cb 35.7 x cl 40.0 mm), NSMT-Cr 7329, from off Midway. Scale 0.5 mm.

17117; WA06-D210D, 1 ovig. ♀ (cb 14.1 mm), NSMT-Cr 17118; WA06-E150, 1 ♂ (cb 22.7 mm), NSMT-Cr 17112; WA06-E210, 2 ♂♂ (cb 12.7, 15.1 mm), NSMT-Cr 17113; WA06-F210, 1 ♂ (cb 15.1 mm), NSMT-Cr 17115; WA06-F250, 1 ♀ (cb 17.6 mm), NSMT-Cr 17114; WA06-G150, 1 ovig. ♀ (cb 18.8 mm), NSMT-Cr 17116; WA07-B150, 1 ♂ (cb 10.8 mm), 1 young ♂ (cb 5.6 mm), 1 ovig. ♀ (cb 11.9 mm), NSMT-Cr 18941; WA07-B550, 1 ovig. ♀ (cb 22.9 mm), NSMT-Cr 18942; WA07-C410, 2 ♂♂ (cb 15.7, 19.9 mm), 1 ovig. (cb 18.4 mm), NSMT-Cr 18943; WA07-D350, 2 ♀♀ (cb 21.0, 21.5 mm), NSMT-Cr 18944; WA07-F150, 1 ♂ (cb 21.5 mm), NSMT-Cr 18945; WA9204, K-4, st. 4, 5 ♂♂ (cb 7.2–14.2 mm), 5 juvs. (cb 3.2–6.0 mm), NSMT-Cr 17628; WA9201, K-6, st. 2, 1 ♂ (cb 8.2 mm), NSMT-Cr 17629.

Remarks. Takeda (1987) regarded *Oregonia mutsuensis* Yokoya, 1928 (type locality: Mutsu Bay, northern Honshu, Japan) as a young form of *O. gracilis* and thus synonymised it with *O. gracilis*. In this study, several young male specimens (cl<4.9 mm) were examined, which agree well with the original description of *O. mutsuensis* particularly in the slightly divergent rostral spines and the triangular telson. We concur with Takeda's (1987) synonymy.

Komai and Yakovlev (2000) redescribed *Hyas kurilensis* Kobjakova, 1962 (type locality: South Kurile Islands, Russia) and transferred the species to the genus *Oregonia*. They differenciated *O. kurilensis* from *O. gracilis* by: (1) the rostral spines of males are relatively shorter in *O. kurilensis* than in *O. gracilis* (0.19–0.30 cl vs. 0.31–0.54 cl); (2) the presence of a prominent tubercle just above the postorbital sinus in adult specimens, which is absent in *O. gracilis*; (3) the second (first movable) segment of the antennal peduncle is noticeably curved basally in *O. kurilensis* but it is nearly straight or slightly curved in *O. gracilis*. We verified that these diagnostic characters apply to the present specimens of *O. gracilis*.

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, 39 species of reptant crustaceans are recorded from shelf waters to bathyal zone off northeastern Japan. There are still a few species of which the occurrence needs to be verified. Yokoya (1933) recorded *Munida japonica* Stimpson, 1858 from northeastern Honshu, but recent study by Macpherson and Baba (1993) has shown that there were many misidentifications in previous literature of *M. japonica*. Examination of specimens from off Miyako, Iwate Prefecture, in CBM collection, has revealed the occurrence of *Munida honshuensis* (Benedict, 1902), a species sometimes considered to be a junior synonym of *M. japonica* (cf. Balss, 1913; Baba, 1988). It is highly possible that Yokoya's (1933) record of *M. japonica* might be actually referred to *M. honshuensis*. Yokoya (1933) referred one male specimen from off Kinkazan at depths of 344–680 m to *Pagurus conformis* de Haan, 1849 (as *Eupagurus*). Komai (2004) revised the taxonomy of that taxon, and clarified misidentifications in previous literature. *Pagurus conformis* is distributed in shallow temperate waters in East Asia, and thus far the occurrence of the species in deep-water in northeastern Honshu has not been confirmed (Komai, 2004). Considering the many misidentifications by Yokoya (1933) (cf. Komai, 2004), it is highly possible that Yokoya's specimen represent a species other than *P. conformis*.

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 (48.3% of the total 31 species): *Lithodes aequispina*, *Paralomis multispina*, *P. verrilli* (Lithodidae); *Elassochirus cavimanus*, *Pagurus rathbuni*, *P. townsendi*, *P. trigonocheirus* (Paguridae); *Parapagurus benedicti* (Parapaguridae); *Erimacrus isenbeckii* (Cheiragonidae); *Chionoecetes angulatus*, *C. bairdi*, *C. opilio*, *Hyas alutaceus*, *Oregonia bifurca*, *O. gracilis* (Oregoniidae).

(2) East Asian endemic elements contain 13 species (41.9%): *Calocarides soyoi* (Calocarididae); *Alloeopagurodes spiniacicula*, *Pagurus parvispina*, *P. pectinatus*, *P. proximus* (Paguridae); *Cancer gibbosulus* (Cancridae); *Podocatactes hamifer* (Corystidae); *Tymolus japonicus* (Cyclodorippidae); *Ethusina wakataka* sp. nov. (Ethusidae); *Chorilia japonica*, *Scyra compressipes* (Epialtidae); *Eplumula phalangium* (Latreilliidae); *Chionoecetes japonicus* (Oregoniidae).

(3) West Pacific or Indo-West Pacific elements include only three species (9.7%): *Phylladiorhynchus pusillus* (Galatheidae); *Tymolus uncifer* (Cyclodorippidae); *Ebalia tuberculosa* (Leucosiidae).

Bathymetric range

The bathymetrical range of each species is summarized in Table 3. The following eight species occurred only on continental shelf depths (shallower than 200 m), although some of them were previously recorded from depths greater than 200 m: *Calocarides soyoi*, *Pagurus pectinatus*, *P. proximus*, *Cancer gibbosulus*, *Podocatactes hamifer*, *Tymolus japonicus*, *Eplumula phalangium*, and *Scyra compressipes*. All species are categorized as East Asian endemic elements.

Bathymetrical zonation is clearly recognized in hermit crabs and *Chionoecetes* species. In

Table 3. Bathymetrical range and frequency of thalassinidean, anomuran, and brachyuran crustaceans collected from off the Pacific coast of northern Japan. Abbreviations: EA: endemic to East Asian waters; I-WP: Indo-West Pacific; NP: northern North Pacific.

Depth (m)	150	210	250	280	310	350	380	410	425	450	480	510	550	650	750	900	1000	1200	1500	2000	Present study	Known range	Distribution pattern
Infraorder Thalassinidea																							
Calocarides soyoi	2																				150–151 m	138–270 m	EA
Infraorder Anomura																							
Pagurus pectinatus	4																				65–156 m	4–71 m	EA
Pagurus proximus	1																				149–155 m	0–10 m	EA
Alloeopagurus spiniacicula	2																				146–156 m	66–259 m	EA
Phylladiorhynchus pusillus	1				1																150–310 m	0–310 m	I-WP
Elassochirus cavimanus	5	5	5	6	2	3	2														150–384 m	36–400 m	NP
Pagurus parvispina		1																			213 m	150–200 m	EA
Pagurus trigonocheirus		3	9	3	10	11	7	13	6	4	1										208–497 m	0–300 m	NP
Pagurus rathbuni					2	2	2	3													305–420 m	9–210 m	NP
Pagurus townsendi					1	4	7	9	9	17	13	16	9	10	9	3	1				311–1031 m	325–1143 m	NP
Lithodes aequispina								2					1		1						406–754 m	274–1100 m	NP
Paralomis multispina																	1	1			1008–1202 m	500–1665 m	NP
Parapagurus benedicti																	2	2	3	5	1008–2056 m	757–2400 m	NP
Paralomis verilli																				1	1845–1948 m	1238–2379 m	NP
Infraorder Brachyura																							
Cancer gibbosulus	8																				146–156 m	30–100 m	EA
Podocatactes hamifer	1																				150–151 m	45–476 m	EA
Tymolus japonicus	2																				146–156 m	15–600 m	EA
Eplumula phalangium	1																				155–156 m	30–307 m	EA
Scyra compressipes	1																				146–147 m	10–260 m	EA
Tymolus uncifer	1	1																			150–214 m	55–741 m	I-WP
Ebalia tuberculosa	2	1																			146–213 m	55–550 m	I-WP
Erimacrus isenbeckii	1	2	2		2																153–315 m	10–300 m	NP
Oregonia gracilipes	5	3	3			2		1					1								146–550 m	0–370 m	NP
Chorilia japonica	4	6	8	4	6	3	4	4	3	3	4	2	1								146–549 m	85–595 m	EA
Chionoecetes opilio		2			1	3	1	1	1	2	1										208–482 m	20–1200 m	NP
Hyas alutaceus						1			1												359–426 m	30–200 m	NP
Chionoecetes bairdi								1													409–415 m	10–466 m	NP
Chionoecetes japonicus									1	2	1			2		2	1		4		418–1511 m	450–2500 m	EA
Chionoecetes angulatus																	2		1	2	1008–2043 m	90–2972 m	NP
Oregonia bifurca																		1	1		1196–1543 m	200–1397 m	NP
Ethusina wakataka sp. nov.																			1		1466–1471 m	—	EA

Table 4. Checklist of species of thalassinidean, anomuran, and brachyuran crustaceans from off the Pacific coast of northern Japan, occuring at depths greater than 150 m. *Species not represented in the present collection.

Infraorder Thalassinidea	
Family Axiidae	
Calocarides soyoi (Yokoya, 1933)	Yokoya (1933); Komai and Kensley (1992); this study
Infraorder Anomura	
Family Galatheidae	
? *Munida japonica* Stimpson, 1858*	Yokoya (1933)
Phylladiorhynchus pusillus (Henderson, 1885)	Yokoya (1933, as *Galathea integra* Benedict, 1902); this study
Family Lithodidae	
Lithodes aequispina Benedict, 1894	Yokoya (1933); Igarashi (1970a); Sakai (1976); Toriyama (1986); Takeda and Hayashi (1990); Takeda (1993); this study
Lithodes couesi Benedict, 1894*	Sakai (1971, 1976)
Lithodes longispina Sakai, 1971*	Sakai (1976)
Paralomis hystrix (de Haan, 1844)*	Toriyama (1986)
Paralomis multispina Benedict, 1895	Igarashi (1970a); Sakai (1976); Takeda (1993); this study
Paralomis verrilli (Bebedict, 1895)	Sakai (1976); Miyake (1982); Toriyama (1986); this study
Family Paguridae	
Alloeopagurodes spiniacicula Komai, 1998	this study
Elassochirus cavimanus (Miers, 1879)	Yokoya (1933); Takeda and Hayashi (1990); this study
Labidochirus anomalus (Balss, 1913)*	Yokoya (1933, as *Eupagurus anomalus*)
? *Pagurus conformis* de Haan, 1849*	Yokoya (1933)
Pagurus ochotensis Brandt, 1851*	Takeda and Hayashi (1990)
Pagurus parvispina Komai, 1997	Komai (1997); this study
Pagurus pectinatus (Stimpson, 1858)	this study
Pagurus proximus Komai, 2000	this study
Pagurus rathbuni Benedict, 1892	this study
Pagurus townsendi Benedict, 1892	Komai (1993); Takeda (1993); this study
Pagurus trigonocheirus Stimpson, 1858	Yokoya (1933); Igarashi (1970a); Takeda and Hayashi (1990); Takeda (1993); this study
Family Parapaguridae	
Parapagurus benedicti de Saint Laurent, 1972	Asakura (2006b); this study
Infraorder Brachyura	
Family Cancridae	
Cancer gibbosulus (de Haan, 1835)	Yokoya (1933); this study
Family Cheiragonidae	
Erimacrus isenbeckii (Brandt, 1848)	Yokoya (1933); Takeda and Hayashi (1990); this study
Family Corystidae	
Podocatactes hamifer Ortmnann, 1894	Yokoya (1933); this study
Family Cyclodorippidae	
Tymolus japonicus Stimpson, 1858	Yokoya (1933); this study
Tymolus uncifer (Ortmann, 1892)	Yokoya (1933); this study
Family Ethusidae	
Ethusina wakataka sp. nov.	this study
Family Epialtidae	
Chorilia japonica Miers, 1879	Yokoya (1933, as *Chorilia longipes japonica*); this study
Pugettia minor Ortmann, 1893*	Yokoya (1933)
Scyra compressipes Stimpson, 1857	Yokoya (1933); this study
Family Latreilliidae	
Eplumula phalangium (de Haan, 1839)	this study
Family Leucosiidae	
Ebalia tuberculosa (A. Milne Edwards, 1873)	Yokoya (1933, as *Ebalia japonica* Rathbun, 1932); this study
Family Oregoniidae	
Chionoecetes angulatus Rathbun, 1924	Sakai (1976); Takeda (1995); this study
Chionoecetes bairdi Rathbun, 1924	this study
Chionoecetes japonicus Rathbun, 1932	Sakai (1976); Miyake (1983); Toriyama (1986); Takeda and Hayashi (1990); this study
Chionoecetes opilio O. Fabricius, 1788	Yokoya (1933); Sakai (1976); Takeda and Hayashi (1990); this study
Hyas alutaceus Brandt, 1851	Sakai (1976, as *Hyas coarctatus alutaceus*); Takeda and Hayashi (1990); this study
Oregonia bifurca Rathbun, 1902	this study
Oregonia gracilis Dana, 1851	Yokoya (1933); Sakai (1976); Miyake (1983); this study

hermit crabs, *E. cavimanus* is dominant in 150–250 m deep, *P. trigonocheirus* is dominant in 250–400 m deep, *P. townsendi* is dominant in 400–750 m deep, and *Parapagurus benedicti* occurs at the depths greater than 1000 m. In the snow crabs of *Chionoecetes*, *C. opilio* is dominant in 300–450 m deep and *C. japonicus* is dominant in 400–2000 m deep. At the depths of 400–450 m where both species inhabit, natural hybrid crabs between both species are rarely found (M. Ito, T. Hattori, and Y. Narimatsu, unpublished data). Hybrids between *C. opilio* and *C. japonicus* were found also in the Sea of Japan (Nishimura and Mizusawa, 1969; Horii, 1982; Torisawa and Mitsuhashi, 1989).

Acknowledgements

The authors' cordial thanks are due to Drs. M. Ito, T. Hattori, and Y. Narimatsu and the crew of the R/V *Wakataka-maru* of the FRA for their help in collecting specimens on board. Our thanks are also due to Dr. S. Kojima of the Ocean Research Institute, The University of Tokyo, and the crew of the R/V *Tansei-maru* of the JAMSTEC for their support during the KT-07-29 cruise. We are indebt to Drs. P. Castro of the California State Polytechnic University and S. T. Ahyong of the National Institute of Water and Atmosphere, New Zealand, for reviewing the manuscript and offering valuable comments for improvements.

References

Ahyong, S. T., 2008. Deepwater crabs from seamounts and chemosynthetic habitats off eastern New Zealand (Crustacea: Decapoda: Brachyura). *Zootaxa*, (1708): 1–72.

Asakura, A., 2006a. Shallow water hermit crabs of the families Pylochelidae, Diogenidae and Paguridae (Crustacea: Decapoda: Anomura) from the Sea of Japan, with a description of a new species of *Diogenes*. *Bulletin of the Toyama Science Museum*, **29**: 23–103.

Asakura, A., 2006b. Recent topics on taxonomy of hermit crabs from Japanese waters – Family Parapaguridae Part III. *Aquabiology*, **28**: 309–316. (In Japanese with English abstract.)

Baba, K., 1988. Chirostylid and Galatheid crustaceans (Decapoda: Anomura) of the "Albatross" Philippines Expedition, 1907–1910. *Researches on Crustacea, Special Number*, (2): v+203 pp.

Baba, K., 1991. Crustacea Decapoda: *Alainius* gen. nov., *Leiogalathea* Baba, 1969, and *Phylladiorhynchus* Baba, 1969 (Galatheidae) from New Caledonia. *In*: Crosnier, A. (ed.), Résultats des Campagnes MUSORSTOM, Volume 9. *Mémoires du Muséum national d'Histoire naturelle*, (152): 479–491.

Baba, K., 2005. Deep-sea chirostylid and galatheid crustaceans (Decapoda: Anomura) from the Indo-Pacific, with a list of species. *Galathea Report*, (20): 1–317.

Balss, H., 1913. Ostaiatische Decapodes I. Die Galatheidem und Paguriden. *In*: Doflein, F. (ed.), Beiträge zur Naturgeschichte Ostasiens. *Abhandlungen der mathematisch-physischen Klasse der K. Bayerischen Akademie der Wissenschaften*, München (supplement), **2**(9): 1–85, pls. 1–2.

Birshtein, Y. A. and L. G. Vinogradov, 1951. [New and rare decapods of the Okhotsk Sea and Kurile Islands waters]. *Doklady Akademii Nauk SSSR*, **79**: 357–360. (In Russian.)

Birshtein, Y. A. and N. A. Zarenkov, 1970. [Bottom decapods (Crustacea: Decapoda) of the Kurile-Kamchatka Trench area]. *In*: Bogorov, V. G. (ed.), [Fauna of the Kurile-Kamchatka Trench and its Environment]. *Trudy Instituta Okeanologii*, **86**: 420–426. (In Russian.)

Castro, P., 2005. Crabs of the subfamily Ethusinae Guinot, 1977 (Crustacea, Decapoda, Brachyura, Dorippidae) of the Indo-West Pacific region. *Zoosystema*, **27**: 499–600.

Castro, P., A. B. Williams and L. L. Cooper, 2003. Revision of the family Latreilliidae Stimpson, 1858 (Crustacea, Decapoda, Brachyura). *Zoosystema*, **25**: 601–634.

Dawson, E. W., 1989. King crabs of the world (Crustacea: Lithodidae) and their fisheries. A comprehensive bibliography. *New Zealand Oceanographic Institute Miscellaneous Publication*, (101): 1–338.

Garth, J. S., 1958. Brachyura of the Pacific coast of America: Oxyrhyncha. *Allan Hancock Pacific Expeditions*, **21**: 1–854.

Hart, J. F. L., 1982. Crabs and their relatives of British Columbia. *British Columbia Provincial Museum Handbook*, (40): 1–267.

Ho, P.-H., P. K. L. Ng, T.-Y. Chan and D.-A. Lee, 2004. New records of 31 species of brachyuran crabs from the joint Taiwan-France expeditions, "Taiwan 2000" and "Taiwan 2001", off deep waters in Taiwan. *Crustaceana*, **77**: 641–668.

Horii, N., 1982. [On sterility of F2 of hybrid between *Chionoecetes opilio* and *C. japonicus*]. *Toyamaken-Seibutsu-Gakkaishi*, (21-22): 3–10. (In Japanese.)

Igarashi, T., 1970a. A list of marine decapod crustaceans from Hokkaido, deposited at the Fisheries Museum, Faculty of Fisheries, Hokkaido University II. Anomura. *Contribution from the Fisheries Museum, Faculty of Fisheries, Hokkaido University*, (12): 1–15, pls. 1–9.

Igarashi, T., 1970b. A list of marine decapod crustaceans from Hokkaido, deposited at the Fisheries Museum, Faculty of Fisheries, Hokkaido University III. Brachyura. *Contribution from the Fisheries Museum, Faculty of Fisheries, Hokkaido University*, (13): 1–18, pls. 1–10.

Ikeda, H., 1998. The deep-sea crabs of Sagami Bay. 180 pp. Hayama Shiosai Museum, Hayama. (In Japanese.)

Kensley, B. and T. Komai,1992. Redescription of *Calocarides soyoi* (Yokoya, 1933) from Japan (Crustacea: Decapoda: Axiidae). *Proceedings of the Biological Society of Washington*, **105**: 81–85.

Kobjakova, Z. I., 1958. [Systematic review of the Decapoda of the southern Kurile Islands]. *Issledovaniya Dal'nevostochnykh Morei SSSR*, **5**: 220–248. (In Russian.)

Kobjakova, Z. I., 1962. Some rare and new species of Decapoda, Malacostraca, from Kurile Islands. *Investigations in Far East Seas USSR*, **8**: 243–247. (In Russian.)

Komai, T., 1993. The occurrence of a rare pagurid hermit crab, *Pagurus townsendi* (Benedict, 1892) (Decapoda, Anomura, Paguridae), in the northwestern Pacific. *Proceedings of the Japanese Society of Systematic Zoology*, (49): 20–24.

Komai, T., 1997. *Pagurus parvispina*, a new species of hermit crab (Decapoda: Anomura: Paguridae) from northern Japan. *Natural History Research*, **4**: 113–124.

Komai, T., 1998. *Alloeopagurodes spiniacicula*, a new genus and new species of hermit crab (Decapoda: Anomura: Paguridae) from Japan. *Crustacean Research*, (27): 70–81.

Komai, T., 2000a. Redescription of *Pagurus pectinatus* (Crustacea: Decapoda: Anomura: Paguridae). *Natural History Research, Special Issue*, (7): 323–337.

Komai, T., 2000b. The identity of *Pagurus brachiomastus* and descriptions of two new species of *Pagurus* (Crustacea: Decapoda: Anomura: Paguridae) from the northwestern Pacific. *Species Diversity*, **5**: 229–265.

Komai, T., 2004. Redescription of *Pagurus conformis* De Haan, the senior synonym of *Pagurus megalops* (Stimpson). *Species Diversity*, **9**: 343–358.

Komai, T., S. Maruyama and K. Konishi, 1992. A list of decapod crustaceans from Hokkaido, northern Japan. *Researches on Crustacea*, (21): 189–205. (In Japanese with English abstract.)

Komai, T. and Y. M. Yakovlev, 2000. Decapod crustaceans collected during the Biological Expedition to the Kamchatka Peninsula and the North Kuril Islands in1997. *Natural History Research, Special Issue*, (7): 301–322.

Lemaitre, R., 1989. Revision of the genus *Parapagurus* (Anomura: Paguroidea: Parapaguridae), including redescriptions of the western Atlantic species. *Zoologische Verhandelingen*, (253): 1–106.

Lemaitre, R., 1999. Crustacea Decapoda: A revision of the species of the genus *Parapagurus* Smith, 1879 (Parapaguridae) from the Pacific and Indian Ocean. *In*: Crosnier, A. (ed.), *Résultats des Campagnes MUSORSTOM*, Volume 20. *Mémoires du Muséum national d'Histoire naturelle*, (180): 303–378.

Macpherson, E. and K. Baba, 1993. Crustacea Decapoda: *Munida japonica* Stimpson, 1858, and related species (Galatheidae). *In*: Crosnier, A. (ed.), Résultats des Campagnes MUSORSTOM, Volume 10. *Mémoires du Muséum national d'Histoire naturelle*, (156): 381–420.

Makarov, V. V., 1938. Rakoobraznye. Anomura. *In*: Shtakel'berg, A. A. (ed.), Fauna SSSR, n. ser. 16, 10(3). x+324 pp., 5 pls. Akademie Nauk SSSR, Moscow and Leningrad. (In Russian.)

Makarov, V. V., 1962. Fauna of U.S.S.R. Vol. 10(3). Crustacea. Anomura. 278 pp., 5 pls. Israel Program for Scientific Translation, Jerusalem.

Martin, J. W. and T. A. Haney, 2005. Decapod crustaceans from hydrothermal vents and cold seeps: a review through 2005. *Zoological Journal of the Linnean Society*, **145**: 445–522.

Marumura, M. and A. Kosaka, 2003. Catalogue of Brachyuran and Anomuran crabs Collection Donated by the late Mr. Seiji Nagai to the Wakayama Prefectural Museum of Natural History. 74 pp. Wakayama Prefectural Museum of Natural History, Kainan.

McLaughlin, P. A., 1974. The hermit crabs (Crustacea Decapoda, Paguridae) of northwestern North America. *Zoologische Verhandelingen*, (130): 1–396.

McLaughlin, P. A., D. L. Rahayu, T. Komai and T.-Y. Chan, 2007. A catalog of the hermit crabs (Paguroidea) of Taiwan. viii+365 pp. National Taiwan Ocean University, Keelung.

Miyake, S., 1982. Japanese Crustacean Decapods and Stomatopods in Color, Vol. I. vii + 261 pp., 56 pls. Hoikusha, Osaka. (In Japanese.)

Miyake, S., 1983. Japanese Crustacean Decapods and Stomatopods in Color, Vol. II. vii + 277 pp., 64 pls. Hoikusha, Osaka. (In Japanese.)

Nagai, S. and E. Tsuchida, 1989. Report of Brachyura Dorippidae *Ethusina robusta* Miers, 1886 from Kumano Trough off Pacific coast of Japan. *Nankiseibutu*, **31**: 85–86. (In Japanese.)

Ng, P. K. L. and P.-H. Ho, 2003. On the deep-water dorippid crabs of the genus *Ethusina* Smith, 1884 (Crustacea: Decapoda: Brachyura) from Taiwan. *Raffles Bulletin of Zoology*, **51**: 71–85.

Nishimura, S. and R. Mizusawa, 1969. On the possible natural interbreeding between *Chionoecetes opilio* (O. Fabricius) and *C. japonicus* Rathbun (Crustacea: Decapoda), a preliminary report. *Publication of the Seto Marine Biological Laboratory*, **17**: 193–208.

Rathbun, M. J., 1902. Descriptions of new decapod crustaceans from the west coast of North America. *Proceedings of the United States National Museum*, **24**: 885–905.

Rathbun, M. J., 1904. Decapod crustaceans of the northwest coast of North America. *Harriman Alaska Series*, **10**: 1–210.

Rathbun, M. J., 1925. The spider crabs of America. *United States National Museum Bulletin*, **129**: 1–613.

Saint Lauren, M. de, 1972. Sur la famille des Parapaguridae Smith, 1882. Description de *Typhlopagurus foresti* gen. nov., et de quinze espèces ou sous-espèces nouvelles de *Parapagurus* Smith (Crustacea, Decapoda). *Bijdragen tot de Dierkunde*, **42**: 97–123.

Sakai, K., 1987. Biogeographical records of five species of the family Lithodidae from the abyssal valley off Gamoda-misaki, Tokushima, Japan. *Researches on Crustacea*, (16): 19–24, pls. 1–3.

Sakai, T., 1971. Illustrations of 15 species of crabs of the family Lithodidae, two of which are new to science. *Researches on Crustacea*, (4/5): 1–49, pls. 1–21.

Sakai, T., 1976. Crabs of Japan and the Adjacent Seas. xxix + 773 pp. (English vol.); 16 pp., 251 pls. (Plate vol.); 461 pp. (Japanese vol.). Kodansha, Tokyo.

Sakai, T., 1978. Decapod Crustacea from the Emperor Seamount Chain. *Researches on Crustacea*, (8) Supplement: 1–39, pls. 1–3.

Takeda, M., 1987. *Oregonia mutsuensis* Yokoya, 1928, as a synonym of *O. gracilis* Dana, 1851. *Memoirs of the National Science Museum*, (20): 133–136. (In Japanese with English abstract.)

Takeda, M., 1993. Four deep-sea species of anomuran crustaceans from Pacific coast of eastern Hokkaido. *Memoirs of the National Science Museum*, (26): 95–100.

Takeda, M., 1995. Geological notes on the crabs from Onagawa Bay and its adjacent water, Northeast Honshu, Japan. *Memoirs of the National Science Museum*, (28): 135–145. (In Japanese with English abstract.)

Takeda, M., 2001. Annotated list of crabs from Tosa Bay, Southwest Japan, collected by the R/V *Kotaka Maru* during the years 1997–2000. *In*: Fujita, T., H. Saito and M. Takeda (eds.), Deep-sea Fauna and Pollutants in Tosa Bay. *National Science Museum Monographs*, (20): 217–262.

Takeda, M. and H. Hayashi, 1990. Biogeographical notes on the anomuran and brachyuran crustaceans from the Pacific coast of eastern Hokkaido, northern Japan. *Bulletin of the Biogeographical Society of Japan*, **45**: 51–59.

Takeda, M. and T. Miyauchi, 1992. Crustaceans from the Soya Strait, northern Hokkaido. *Memoirs of the National Science Museum*, (25): 143–153.

Torisawa, M. and M. Mitsuhashi, 1989. ["Hybrid", whose son? Searching for the parent of *Chionoecetes* hybrid]. *Hokusuishi-Dayori*, (6): 1–7. (In Japanese.)

Toriyama, M., 1986. Outline of the research. *In*: Baba, K., K. Hayashi and M. Toriyama (eds.), *Decapod Crustaceans from Continental Shelf and Slope around Japan −Fiscal 1985 Project Entrusted by the Fisheries Agency of Japan−*, pp. 18–29. Japan Fisheries Resource Conservation Association, Tokyo.

Vinogradov, L. G., 1950. Classification of shrimps, prawns and crabs from Far East. *Izvestia TINRO*, **33**: 179–358, pls. 1–53. (In Russian.)

Watabe, H. and Y. Miyake, 2000. Decapod fauna of the hydrothermally active and adjacent fields on the Hatoma Knoll, southern Japan. *JAMSTEC Journal of Deep-sea Research*, (17): 29–34.

Yokoya, Y., 1928. Report of the biological survey of Mutsu Bay. 10. Brachyura and crab-shaped Anomura. *Science Reports of the Tôhoku Imperial University*, Fourth Series (Biology), **3**: 757–784.

Yokoya, Y., 1933. On the distribution of decapod crustaceans inhabiting the continental shelf around Japan, chiefly based upon the materials collected by S. S. Soyo-Maru, during the year 1923–1930. *Journal of the College of Agriculture, Tokyo Imperial University*, **12**: 1–225.