

## Fishes Collected by Commercial Size Midwater Trawls from the Pacific Coast off Northern Japan

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**Abstract:** Mesopelagic fishes collected by a large midwater trawl in the Pacific Ocean off northern Japan in 1996 were investigated taxonomically. A total of 142 species belonging to 53 families of 15 orders were listed with inventory information and taxonomic remarks. *Nessorhamphus danae* (Derichthyidae) and *Chaenophryne longiceps* (Oneirodidae) were recorded as new to Japanese waters. New Japanese names were established for *Scopelosaurus adleri* (Notosudidae), *Brephostoma carpenteri* (Epigonidae) and *Chiasmodon lavenbergi* (Chiasmodontidae) based on the specimens.

**Key words:** mesopelagic fishes, midwater trawl, transitional zone, northern Japan

### Introduction

Many scientific expeditions to study the fishes in the transitional zone in the western North Pacific revealed the occurrence of about 50 mesopelagic species (Mead and Taylor, 1953; Parin, 1961; Sokolovskaya, 1972; Gordon *et al.*, 1985; Peden *et al.*, 1985; Willis *et al.*, 1988). Most of the surveys were usually carried out by small nets such as an IKMT (Isaacs-Kidd Midwater Trawl) with 7.32 m<sup>2</sup> mouth opening (e.g., Parin, 1961; Willis *et al.*, 1988). The IKMT net is suitable to collect only slow mobile and/or small animals owing to its small mouth opening (Makushok, 1970; Pearcy, 1980). On the other hand, commercial size large midwater trawls provided new collection data on the species composition and structure in the mesopelagic zone of the western North Pacific (e.g., Balanov and Il'inskii, 1992; Lapko and Ivanov, 1993; Balanov *et al.*, 1995; Il'inskii *et al.*, 1995; Parin *et al.*, 1995; Ivanov, 1997; Watanabe *et al.*, 1999). For instance, the mesopelagic ichthyofauna of the Bering Sea was extended to 16 species by Balanov and Radchenko (1995) and Balanov and Fedorov (1996). Ivanov (1997) reported 84 species of midwater species from the northern part of the transitional zone in the western North Pacific.

In the summer of 1996, the Ocean Research Institute of the University of Tokyo made a midwater trawl survey in the Pacific Ocean off northern Honshu Island, Japan (Fig. 1). We report 142 species belonging to 53 families of 15 orders collected by the commercial size trawls.

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\*deceased

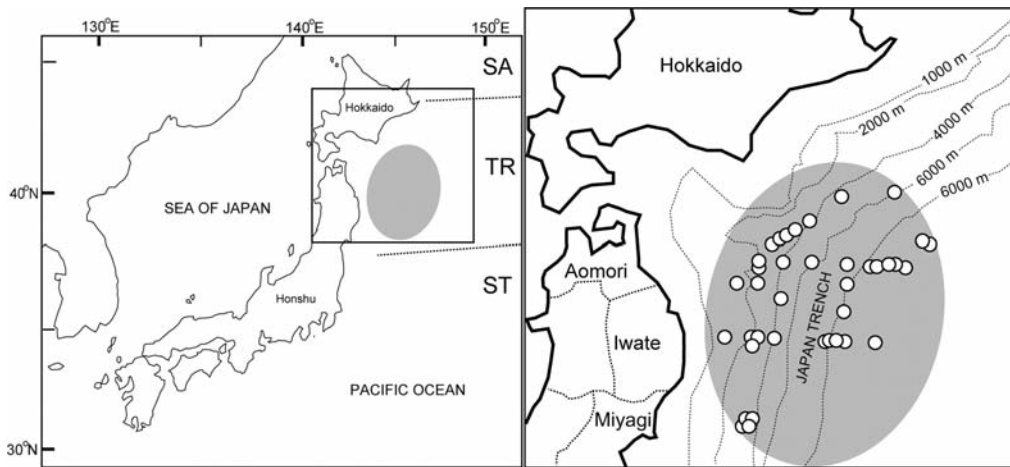


Fig. 1. Sampling stations (open circles) of the midwater trawl survey in 1996. SA, Subarctic Region; ST, Subtropical Region; TR, Transition Region.

## Materials and Methods

Specimens were collected from 66 trawl samplings during the period between 4 and 30 July 1996 by the commercial fish trawler F/V *Marusada-maru No. 30*, which was chartered by the Japan Marine Fishery Resources Research Center (Fig. 2A-B, Table 1). The commercial trawls of 103 m length and 40 to 30 m mouth width were towed at 3 knots on average (covering 490 m<sup>2</sup>). The last 11 m of cod end included 18 mm mesh liner (Fig.2C).

Specimens are deposited in the Institute of Marine Biology, Russian Academy of Sciences, Vladivostok (MIMB) and the National Museum of Nature and Science, Tokyo (NSMT-P). The number of specimens is shown in parentheses after the catalog number. The identified species are arranged following the system of Nelson (1994). Both scientific and Japanese names are generally followed Nakabo (2002). Terminology of head pores for the Derichthyidae follows Robins (1989). Total length, standard length and head length are abbreviated as TL, SL and HL, respectively. Depth and latitudinal data were given for each species from the captured specimens.

## Species List

### Order Petromyzontiformes

#### Family Petromyzontidae

*Entosphenus tridentatus* (Gairdner, 1836) [Japanese name: Mitsubayatsume]

St-8: NSMT-P 58455 (1), 27.3 cm TL; St-45: NSMT-P 58464(1), 34.2 cm TL.  
40°01.2'N-41°02.1'N, 60-556 m depths.

*Remarks.* This species is a bottom dweller but occasionally captured from midwater (e.g., Fedorov and Parin, 1998: 66.4 cm TL specimen).

### Order Albuliformes

#### Family Albulidae

*Pterothrissus gissu* Hilgendorf, 1877 [Japanese name: Gisu]

St-27: NSMT-P 58489 (1), 17.5 cm SL. 39°59.6'N, 530-557 m depths.

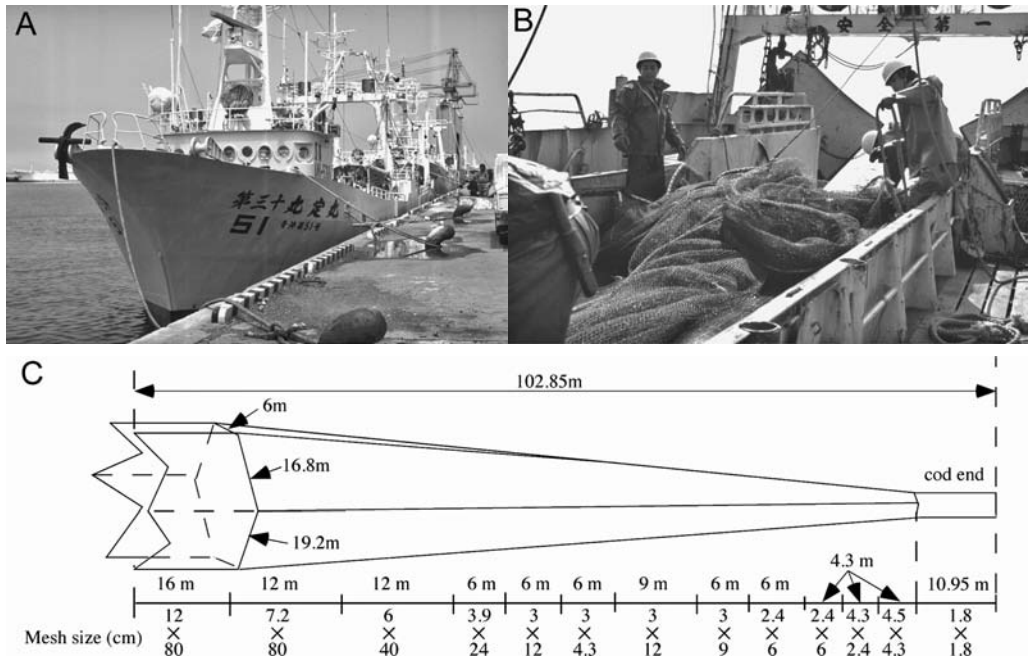


Fig. 2. The F/V *Marusada-maru* No. 30 (A), trawl operation (B) and net specification (C).

Table 1. Sampling stations of fishes by the F/V *Marusada-maru* No. 30 in 1996. Asterisk indicates oblique tow.

Station	Position	Depth (m)	Date	Time
St-1	40°58.9'N, 143°53.4'E	530-558	4 July 1996	07:55-09:55
St-2	41°02.2'N, 144°01.4'E	630-658	4 July 1996	10:50-12:50
St-3	41°01.5'N, 144°11.3'E	630-658	4 July 1996	13:40-15:40
St-4	41°00.9'N, 144°21.2'E	530-553	4 July 1996	16:25-18:55
St-5	41°02.6'N, 144°30.7'E	550-578	5 July 1996	05:45-07:45
St-6	41°01.1'N, 144°40.2'E	630-658	5 July 1996	08:30-10:30
St-7	41°01.5'N, 144°50.5'E	630-658	5 July 1996	11:20-13:20
St-8	41°02.1'N, 145°01.3'E	530-556	5 July 1996	14:10-17:10
St-9	41°05.0'N, 145°00.9'E	530-556	6 July 1996	05:50-07:50
St-10	41°04.4'N, 145°11.0'E	570-596	6 July 1996	08:40-10:40
St-11	41°00.5'N, 145°21.7'E	630-656	6 July 1996	11:35-13:35
St-12	40°57.4'N, 145°29.3'E	550-574	6 July 1996	14:15-17:15
St-13	40°59.8'N, 145°36.0'E	570-598	7 July 1996	06:00-08:00
St-14	41°00.2'N, 145°46.3'E	630-657	7 July 1996	08:45-10:45
St-15	41°03.3'N, 145°54.0'E	630-657	7 July 1996	11:30-14:30
St-16	41°02.5'N, 146°08.6'E	540-564	7 July 1996	15:10-18:10
St-17	41°19.6'N, 146°13.7'E	550-578	8 July 1996	06:00-08:00
St-18	41°16.7'N, 146°23.6'E	610-638	8 July 1996	08:45-10:45
St-19	41°12.0'N, 146°31.5'E	700-728	8 July 1996	11:30-14:00
St-20	40°59.5'N, 146°55.2'E	135-162	9 July 1996	00:10-00:40
St-21	40°43.4'N, 143°10.6'E	530-558	9 July 1996	15:50-18:50
St-22	39°59.4'N, 143°01.7'E	630-658	11 July 1996	16:45-18:45
St-23	40°00.3'N, 143°17.5'E	550-577	12 July 1996	06:05-08:05
St-24	40°01.6'N, 143°27.3'E	570-596	12 July 1996	08:55-10:55
St-25	40°02.6'N, 143°37.4'E	600-626	12 July 1996	11:35-14:35
St-26	40°01.0'N, 143°50.3'E	530-556	12 July 1996	15:15-17:15
St-27	39°59.6'N, 143°32.6'E	530-557	13 July 1996	05:10-07:10

Table 1. (Continued)

Station	Position	Depth (m)	Date	Time
St-28	40°00.1'N, 145°32.3'E	600-627	13 July 1996	11:10-13:10
St-29	39°59.9'N, 145°02.1'E	145-173	14 July 1996	00:07-00:37
St-30	40°00.2'N, 144°59.6'E	60-93	14 July 1996	01:00-01:30
St-31	40°00.3'N, 144°56.9'E	25-55	14 July 1996	01:48-02:18
St-32	39°59.5'N, 144°54.6'E	220-247	14 July 1996	02:45-03:45
St-33	39°56.9'N, 144°57.2'E	320-347	14 July 1996	04:20-05:20
St-34	39°59.9'N, 144°59.4'E	420-447	14 July 1996	05:50-06:50
St-35	40°01.9'N, 144°58.4'E	630-657	14 July 1996	15:10-16:10
St-36	40°01.2'N, 144°53.0'E	530-557	14 July 1996	16:50-17:50
St-37	40°00.6'N, 144°51.6'E	450-476	14 July 1996	18:30-19:30
St-38	39°59.4'N, 145°02.5'E	630-658	15 July 1996	10:10-12:10
St-39	40°18.2'N, 144°57.4'E	630-657	15 July 1996	12:55-14:55
St-40	39°56.2'N, 145°00.7'E	0-200*	15 July 1996	15:19-15:37
St-41	39°57.0'N, 144°59.0'E	320-347	15 July 1996	15:57-16:57
St-42	39°59.1'N, 144°55.9'E	155-182	15 July 1996	17:28-17:58
St-43	40°00.0'N, 144°53.4'E	125-327	15 July 1996	18:23-19:23
St-44	40°01.5'N, 144°49.5'E	160-185	15 July 1996	19:47-20:17
St-45	40°01.2'N, 144°46.9'E	60-89	15 July 1996	20:42-21:12
St-46	40°01.3'N, 144°44.3'E	15-45	15 July 1996	21:30-22:00
St-47	40°01.3'N, 144°40.3'E	530-558	15 July 1996	22:30-23:30
St-48	40°32.6'N, 144°00.0'E	630-658	16 July 1996	11:08-13:08
St-49	40°41.0'N, 144°00.5'E	650-678	16 July 1996	13:50-15:50
St-50	40°48.6'N, 144°01.5'E	440-465	16 July 1996	16:30-18:30
St-51	40°54.8'N, 144°01.3'E	65-93	16 July 1996	18:56-19:56
St-52	41°00.0'N, 144°02.1'E	550-578	19 July 1996	05:15-07:15
St-53	41°00.0'N, 144°12.3'E	650-677	19 July 1996	08:00-10:00
St-54	41°00.0'N, 144°23.0'E	650-677	19 July 1996	10:55-12:55
St-55	40°59.7'N, 144°34.0'E	650-675	19 July 1996	13:45-15:45
St-56	40°59.4'N, 144°44.0'E	550-577	19 July 1996	16:28-18:28
St-57	41°01.4'N, 144°57.4'E	550-577	20 July 1996	06:07-08:07
St-58	41°01.8'N, 145°09.6'E	650-677	20 July 1996	08:55-10:55
St-59	41°02.6'N, 145°20.9'E	650-677	20 July 1996	11:40-13:40
St-60	41°01.1'N, 145°31.4'E	650-677	20 July 1996	14:30-16:30
St-61	40°59.4'N, 145°40.8'E	500-528	20 July 1996	17:35-19:35
St-62	41°01.5'N, 145°42.2'E	550-577	21 July 1996	06:52-08:52
St-63	41°09.3'N, 145°37.5'E	650-677	21 July 1996	09:38-11:38
St-64	41°17.7'N, 145°34.9'E	650-676	21 July 1996	12:26-15:26
St-65	41°27.7'N, 145°30.5'E	500-527	21 July 1996	16:25-19:25
St-66	41°35.5'N, 145°16.2'E	550-578	22 July 1996	06:10-08:10
St-67	41°41.8'N, 145°10.6'E	650-677	22 July 1996	09:00-11:00
St-68	41°48.4'N, 145°06.7'E	650-676	22 July 1996	11:45-13:45
St-69	41°53.5'N, 145°03.7'E	650-677	22 July 1996	14:38-16:38
St-70	41°53.0'N, 144°55.8'E	550-576	22 July 1996	17:26-19:26
St-71	41°54.4'N, 144°51.7'E	550-577	23 July 1996	05:50-07:50
St-72	41°48.2'N, 144°44.2'E	650-677	23 July 1996	08:35-10:35
St-73	41°43.2'N, 144°36.3'E	550-577	23 July 1996	11:20-13:20
St-74	41°38.4'N, 144°28.7'E	650-677	23 July 1996	14:05-16:05
St-75	41°34.5'N, 144°21.7'E	550-577	23 July 1996	16:45-18:45
St-76	41°30.1'N, 144°18.1'E	550-578	24 July 1996	05:10-07:10
St-77	41°25.9'N, 144°11.2'E	550-577	24 July 1996	07:50-09:50
St-78	41°21.2'N, 144°05.0'E	550-577	24 July 1996	10:32-12:32
St-79	41°17.8'N, 143°57.5'E	550-577	24 July 1996	13:15-16:15
St-80	41°11.9'N, 143°47.2'E	550-577	24 July 1996	16:56-18:56
St-81	41°18.0'N, 143°47.4'E	550-577	25 July 1996	05:10-07:10
St-82	41°19.0'N, 143°54.2'E	550-577	25 July 1996	07:50-09:50

Table 1. (Continued)

Station	Position	Depth (m)	Date	Time
St-83	41°14.7 N, 143°46.6 E	550-577	25 July 1996	10:35-12:35
St-84	41°10.2 N, 143°39.9 E	550-577	25 July 1996	13:15-16:15
St-85	41°02.8 N, 143°32.5 E	550-577	25 July 1996	17:00-19:00
St-86	40°58.9 N, 143°30.9 E	550-577	26 July 1996	05:45-07:45
St-87	40°52.5 N, 143°32.0 E	550-577	26 July 1996	08:27-10:27
St-88	40°46.0 N, 143°31.3 E	550-577	26 July 1996	11:08-13:08
St-89	40°40.2 N, 143°28.9 E	550-577	26 July 1996	13:50-15:50
St-90	40°33.7 N, 143°27.9 E	550-577	26 July 1996	16:32-18:32
St-91	39°58.8 N, 143°29.2 E	550-577	27 July 1996	05:47-07:47
St-92	39°51.1 N, 143°27.4 E	650-677	27 July 1996	08:32-10:32
St-93	39°02.4 N, 143°26.6 E	160-188	28 July 1996	00:06-00:36
St-94	39°01.5 N, 143°29.0 E	65-93	28 July 1996	00:59-01:29
St-95	39°04.1 N, 143°31.9 E	25-55	28 July 1996	01:48-02:18
St-96	39°06.1 N, 143°33.1 E	210-240	28 July 1996	02:48-03:48
St-97	39°03.9 N, 143°31.7 E	320-349	28 July 1996	04:20-05:20
St-98	39°02.2 N, 143°29.7 E	450-478	28 July 1996	05:55-06:55
St-99	39°00.6 N, 143°32.1 E	650-677	28 July 1996	15:10-16:10
St-100	39°00.1 N, 143°29.0 E	550-578	28 July 1996	16:53-17:53
St-101	38°57.9 N, 143°27.9 E	450-478	28 July 1996	18:30-19:30
St-102	39°00.2 N, 143°29.7 E	650-679	29 July 1996	10:10-12:10
St-103	38°58.4 N, 143°29.3 E	600-627	29 July 1996	12:58-14:58
St-104	39°04.1 N, 143°33.0 E	550-579	29 July 1996	15:45-16:45
St-105	39°02.9 N, 143°32.5 E	0-200*	29 July 1996	17:10-17:30
St-106	39°03.7 N, 143°33.0 E	240-267	29 July 1996	17:50-18:50
St-107	39°01.6 N, 143°30.4 E	550-578	29 July 1996	19:25-20:25
St-108	39°02.0 N, 143°30.1 E	650-677	29 July 1996	21:12-22:12
St-109	41°01.6 N, 144°13.9 E	650-677	30 July 1996	10:15-12:15
St-110	41°09.7 N, 144°13.7 E	650-677	30 July 1996	13:00-15:00
St-111	41°16.2 N, 144°18.4 E	550-577	30 July 1996	15:45-17:45
St-112	41°22.5 N, 144°23.5 E	450-476	30 July 1996	18:20-19:20
St-113	41°25.2 N, 144°27.1 E	30-65	30 July 1996	19:47-20:47

*Remarks.* This is a leptocephalus larva. The adult specimens are usually caught by bottom trawls.

Order Anguilliformes

Family Derichthyidae

*Derichthys serpentinus* Gill, 1884 [Japanese name: Kubinaga-anago]

St -102: NSMT-P 58494 (2), 16.0-16.3 cm TL. 39°00.2'N, 650-679 m depths.

*Remarks.* *Derichthys serpentinus* had been recorded from tropical and subtropical waters of all main oceans (Gill, 1884; Beebe, 1935; Karmovskaya, 1985; Robins, 1989; Nakabo, 2002). Asano (1987) reported a broken specimen (183 mm TL, stomach content of *Beryx splendens* from Kyushu Palau Ridge). Mochioka (1988) noted a leptocephalus larva (60.7 mm TL, near Ogasawa Islands) in Japanese waters. Recently, Imamura *et al.* (2005) reported a single specimen of 288 mm TL from the mesopelagic zone off Miyagi Prefecture, Japan (266-402 m depths). The present specimens indicate the northernmost occurrence for the species. According to Karmovskaya (1985) and Robins (1989), predorsal length of the species is 24.0-31.6 % TL. The larger specimen extends the range (24.0-33.6 % TL).

*Nessorhamphus danae* Schmidt, 1931 [New Japanese name: Kaizokuheraanago] (Fig. 3A)

St-101: NSMT-P 58500 (1), 31.5 cm TL. 38°57.9'N, 450-478m.

*Description.* Dorsal fin rays 272; anal fin rays 145; pectoral fin rays 14; caudal fin rays 11; vertebrae 64 + 64 = 128. Preanal length 62.3 % TL; predorsal length 19.5; distance between vertical through dorsal and anal fin origins 41.7; body depth 4.1; head length 14.1. Eye diameter 12.3 % HL; postorbital head length 53.6; snout 36.8. Origins of pectoral, dorsal and anal fins on vertical through 10th, 19th and 86th pores of lateral line, respectively. Head small. Anal fin rays shorter than dorsal rays. Rays in posterior part of dorsal and anal fins just before the tail two times shorter than anterior ones except rays near caudal fin base. Conspicuous dark stripe along ventral midline from vertical through eye to anus. Eye diameter 3 times in snout length. Lower jaw shorter than upper. Small conical, recurved teeth in several rows on maxilloethmoid, maxilla, vomer and dentary. Many conspicuous pores on head and in lateral line. Cephalic sensory system: supraorbital

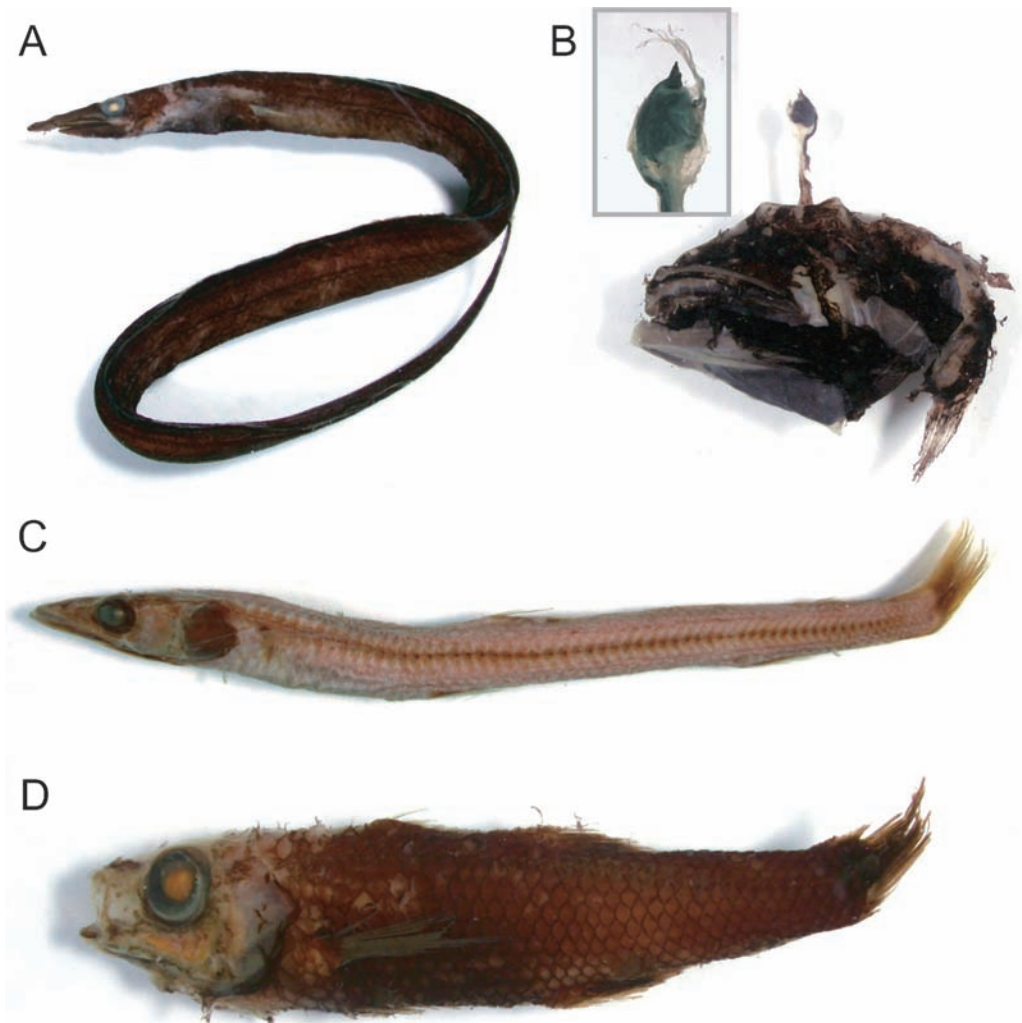


Fig. 3. Preserved fish specimens captured by the F/V *Marusada-maru* No. 30. A, *Nessorhamphus danae* (Derichthyidae), NSMT-P 58500, 31.5 cm TL; B, *Chaenophryne longiceps* (Oneirodidae), NSMT-P 58544, 3.2 cm SL, inset shows esca; C, *Scopelosaurus adleri* (Notosudidae), NSMT-P 58916, 15.4 cm SL; D, *Brephostoma carpenteri* (Epigonidae), NSMT-P 59269, 8.4 cm SL.



pores 5, infraorbital pores 8, preoperculo-mandibular pores  $10 + 2 = 12$ , postorbital pores 2 and occipital pores 3. Many short sensory ridges associated with the cephalic pore system on head. Same ridges found between some pores of lateral line.

*Remarks.* *Nessorhamphus danae* occurs mainly in tropical parts of the Atlantic and Indo-Pacific regions (Schmidt, 1931; Karmovskaya, 1985; Robins, 1989). This is the first record from Japan, a northward range extension to 39°N. The present specimen (318 mm TL, immature female) exhibits the largest size for the species (286 mm TL; see Karmovskaya, 1985). According to Karmovskaya (1985) and Robins (1989), vertebral counts of *N. danae* are 134–145 (including 70–78 precaudal vertebrae). The present specimen extends the range of counts to 128–145 vertebrae (64–78 in precaudal).

#### Family Nemichthyidae

*Avocettina infans* (Günther, 1878) [Japanese name: Kuroshigiunagi]

St-18: NSMT-P 58465 (1), 41.0 (+) cm TL; St-39: NSMT-P 58443 (1), 49.8 (+) cm TL; St-100: NSMT-P 58501 (1), 44.2 (+) cm TL; St-101: NSMT-P 58446 (2), 26.5 (+)–32.1 (+) cm TL; St-102: NSMT-P 58495 (3), 21.0 (+)–54.0 (+) cm TL; St-103: NSMT-P 58442 (5), 21.5 (+)–39.0 (+) cm TL; TR-104: NSMT-P 58630 (2), 22.5 (+)–27.2 (+) cm TL; St-108: NSMT-P 58468 (2), 28.9 (+)–57.0 (+) cm TL. 38°57.9'N–40°18.2'N, 450–679 m depths.

*Nemichthys scolopaceus* Richardson, 1848 [Japanese name: Shigiunagi]

St-31: NSMT-P 58918 (3), 56.5 (+)–56.7 (+) cm TL; St-47: NSMT-P 58879 (2), 45.0 (+)–54.0 (+) cm TL; St-59: NSMT-P 58881 (1), 48.7 (+) cm TL; St-80: NSMT-P 58880 (3), 49.9 (+)–56.7 (+) cm TL; St-99: NSMT-P 58881 (6), 47.1 (+)–56.5 (+) cm TL; St-102: NSMT-P 58941 (2), 45.0 (+)–53.0 (+) cm TL; St-103: NSMT-P 58883 (6), 49.8 (+)–73.0 (+) cm TL, NSMT-P 58917 (2), 59.2 (+)–64.3 (+) cm TL; St-104: NSMT-P 58882 (6), 42.6 (+)–60.5 (+) cm TL; St-108: NSMT-P 58920 (8), 40.7 (+)–72.2 (+) cm TL. 38°58.4'N–41°11.9'N, 25–679 m depths.

#### Family Congridae

*Gnathophis nystromi nystromi* (Jordan and Snyder, 1901) [Japanese name: Ginanago]

St-108: NSMT-P 58441 (1), 9.6 cm TL. 39°02.0'N, 650–677 m depths.

*Remarks.* Specimens are usually caught in bottom trawls (Hataoka, 2002).

#### Family Serrivomeridae

*Serrivomer lanceolatooides* (Schmidt, 1916) [Japanese name: Nisenokobaunagi]

St-35: NSMT-P 58493 (1), 47.5 cm TL; St-38: NSMT-P 58491 (2), 29.0–35.0 cm TL; St-47: NSMT-P 85492 (1), 54.0 cm TL; St-48: NSMT-P 58488 (1), 48.5 cm TL; St-102: MIMB 3174 (3), 52.0–54.5 cm TL; St-103: NSMT-P 58499 (1), 26.0 cm TL; St-104: NSMT-P 58447 (1), 21.6 cm TL; St-108: NSMT-P 58462 (3), 24.5–49.5 cm TL. 38°58.4'N–40°32.6'N, 530–679 m depths.

#### Order Osmeriformes

##### Family Microstomatidae

*Nansenia sanrikuensis* Kanayama and Amaoka, 1983 [Japanese name: Kurosakeiwashi]

St-33: NSMT-P 58951 (1), 15.5 cm SL; St-34: NSMT-P 59196 (2), 20.4–25.0 cm SL; St-80: NSMT-P 58907 (1), 25.2 cm SL; St-96: NSMT-P 59292 (2), 6.4–7.5 cm SL; St-100: NSMT-P

59293 (1), 5.4 cm SL. 39°00.1'N–41°11.9'N, 210–578 m depths.

*Remarks.* Identification follows Aizawa and Hatooka (2002). Although Kawaguchi and Butler (1984) noted that *Nansenia sanrikuensis* may be a junior synonym of *Nansenia candida*, they also suggested that the former species has a higher number of vertebrae (48–49 vs. 44–47 in *N. candida*). The present specimens have 48–49 vertebrae.

#### Family Bathylagidae

***Bathylagus pacificus*** Gilbert, 1890 [Japanese name: Yasesokoiwashi]

St-1: NSMT-P 58421 (1), 13.1 cm SL; St-2: NSMT-P 58429 (1), 14.3 cm SL; St-35: NSMT-P 58416 (2), 14.4–15.6 cm SL; St-36: NSMT-P 58472 (1), 15.0 cm SL; St-47: NSMT-P 58411 (1), 15.1 cm SL. 40°01.2'N–41°02.2'N, 530–658 m depths.

***Dolicholagus longirostris*** (Maul, 1948) [Japanese name: Ginsokoiwashi]

St-39: NSMT-P 58900 (1), 13.0 cm SL; St-47: NSMT-P 58890 (1), 15.2 cm SL; St-99: NSMT-P 58906 (2), 9.7–14.2 cm SL; St-100: MIMB 3177 (2), 13.0–16.0 cm SL; St-102: NSMT-P 58893 (5), 9.9–14.8 cm SL, NSMT-P 58901(16), 7.2–17.5 cm SL; St-103: NSMT-P 58896 (1), 9.0 cm SL, MIMB 3178 (3), 12.6–14.4 cm SL; St-104: NSMT-P 58905 (1), 6.7 cm SL. 38°58.4'N–40°18.2'N, 530–679m.

***Leuroglossus schmidti*** Rass, 1955 [Japanese name: Togariichimonjiiwashi]

St-11: NSMT-P 58466 (4), 12.5–14.5 cm SL; St-14: NSMT-P 58463 (2), 12.5–13.8 cm SL. 41°00.2'N–41°00.5'N, 630–657 m depths.

***Lipolagus ochotensis*** (Schmidt, 1938) [Japanese name: Sokoiwashi]

St-11: NSMT-P 58456 (3), 9.5–17.2 cm SL; St-14: NSMT-P 58457 (5), 7.5–17.3 cm SL; St-21: NSMT-P 58487 (1), 3.7 cm SL; St-80: NSMT-P 58487 (1), 3.7 cm SL. 40°43.4'N–41°11.9'N, 530–657 m depths.

***Melanolagus bercooides*** (Borodin, 1929) [Japanese name: Netaisokoiwashi]

St-34: NSMT-P 58897 (2), 13.7–17.2 cm SL; St-36: NSMT-P 58898 (1), 18.5 cm SL, NSMT-P 58904 (1), 14.0 cm SL; St-39: NSMT-P 58891 (1), 17.5 cm SL, NSMT-P 58902 (1), 8.4 cm SL; St-96: NSMT-P 58888(3), 7.6–17.7 cm SL; St-99: NSMT-P 58903 (2), 11.3–12.4 cm SL; St-101: NSMT-P 58895(1), 16.7 cm SL; St-102: NSMT-P 58889 (1), 15.0 cm SL, NSMT-P 58892 (1), 18.8 cm SL; St-103: MIMB 3179 (3), 7.6–18.4 cm SL; St-104: NSMT-P 58899 (1), 7.7 cm SL, MIMB 3180 (1), 19.0 cm SL. 38°57.9'N–40°18.2'N, 210–679 m depths.

***Pseudobathylagus milleri*** (Jordan and Gilbert, 1898) [Japanese name: Kurosokoiwashi]

St-11: NSMT-P 58471 (5); St-36: NSMT-P 59005 (3), 18.5–19.0 cm SL; St-108: NSMT-P 59004 (2), 14.7–20.0 cm SL. 39.02.0'N–41°00.5'N, 530–677 m depths.

#### Family Opisthoproctidae

***Bathylchnops exilis*** Cohen, 1958 [Japanese name: Mukashidemenigisu]

St-34: NSMT-P 58722 (1), 42.9 cm SL; St-37: NSMT-P 58723 (1), 52.0 cm SL; St-39: NSMT-P 58719 (1), 21.2 cm SL, 630–657 m; St-100: NSMT-P 58720 (2), 11.4–11.8 cm SL; St-101: NSMT-P 59019 (5), 11.0–13.8 cm SL; St-103: NSMT-P 58721 (2), 10.7–11.7 cm SL. 38°57.9'N–40°18.2'N, 420–657 m.



***Dolichopteryx minuscula*** Fukui and Kitagawa, 2006 [Japanese name: Hinademenigisu]

St-15: NSMT-P 58622 (1), 5.3 cm SL; St-25: NSMT-P 59200 (1), 12.0 cm SL; St-27: NSMT-P 59201 (1), 14.5 cm SL; St-34: NSMT-P 59202 (1), 7.0 cm SL; St-39: NSMT-P 58476 (3), 6.9-7.8 cm SL; St-50: NSMT-P 58498 (1), 15.8 cm SL; St-100: NSMT-P 58445 (1), 5.9 cm SL; St-104: NSMT-P 59203 (1), 7.2 cm SL; St-107: NSMT-P 58621 (1), 4.9 cm SL; St-108: NSMT-P 58623 (1), 4.7 cm SL. 39°00.1'N-41°03.3'N, 420-677 m.

***Macropinna microstoma*** Chapman, 1939 [Japanese name: Demenigisu]

St-35: NSMT-P 58435 (1), 9.4 cm SL; St-103: NSMT-P 58434 (1), 11.4 cm SL; St-104: NSMT-P 58437 (1), 7.1 cm SL; St-107: NSMT-P 58436 (1), 4.3 cm SL. 38°58.4'N-40°01.9'N, 550-657 m.

***Winteria telescopa*** Brauer, 1901 [Japanese name: Kurodemenigisu]

St-35: NSMT-P 58439 (1), 14.2 cm SL; St-98: NSMT-P 59020 (3), 10.5-12.4 cm SL; St-104: NSMT-P 58440 (2), 8.4-13.4 cm SL; St-107: NSMT-P 58438 (1), 11.4 cm SL. 39°01.6'N-40°01.9'N, 450-657 m.

## Family Alepocephalidae

***Photostylus pycnopterus*** Beebe, 1933 [Japanese name: Ukeguchitsubuiwashi]

St-108: NSMT-P 58450 (2), 8.7-9.7 cm SL. 39°02.0'N, 650-677 m depths.

*Remarks.* This species was mistakenly excluded from Nakabo's (2002) book on keys to Japanese fishes (M. Aizawa, personal communication). Tsukamoto *et al.* (1992) reported the single specimen from the waters off Shikoku Island, Japan. The present specimens indicate the second record from Japanese waters.

***Talismania antillarum*** (Goode and Been, 1896) [Japanese name: Nokobaiwashi]

St-99: NSMT-P 58432 (1), 4.5 cm SL; St-103: NSMT-P 58431 (1), 13.1 cm SL; St-108: NSMT-P 58433 (1), 10.4 cm SL. 38°58.4'N-39°02.0'N, 600-677 m.

## Family Platytroctidae

***Holtbyrnia innesi*** (Fowler, 1934) [Japanese name: Kantaihanameiwashi]

St-1: NSMT-P 58978 (1), 6.1 cm SL; St-18: MIMB 3189 (1), 15.4 cm SL; St-22: NSMT-P 58972 (1), 11.7 cm SL; St-36: MIMB 3190 (2), 5.3-8.7 cm SL; St-37: NSMT-P 58971 (2), 6.5-7.5 cm SL; St-38: NSMT-P 58975 (1), 3.6 cm SL; St-47: NSMT-P 58974 (2), 5.8-5.9 cm SL; St-82: MIMB 3191 (1), 21.2 cm SL; St-92: NSMT-P 58973 (1), 7.6 cm SL; St-100: NSMT-P 58979 (1), 4.5 cm SL; St-101: NSMT-P 58978 (1), 5.5 cm SL; St-103: NSMT-P 58981 (3), 6.7-23.3 cm SL; St-104: NSMT-P 58977 (4), 5.0-12.5 cm SL; St-107: MIMB 3182 (1), 23.6 cm SL; St-108: NSMT-P 58980 (2), 4.7-21.2 cm SL. 38°57.9'N-41°19.0'N, 450-677 m depths.

***Maulisia argipalla*** Matsui and Rosenblatt, 1979 [Japanese name: Kuzuboshihanameiwashi]

St-22: NSMT-P 58424 (1), 11.5 cm SL; St-28: NSMT-P 58425 (1), 16.6 cm SL; St-99: NSMT-P 59208 (1), 19.3 cm SL. 39°00.6'N-40°00.1'N, 600-677 m depths.

*Remarks.* Okamoto *et al.* (2008) collected a single specimen of *Maulisia argipalla* from east of Aomori and Miyagi prefectures (300-750 m depths) as new to Japanese waters. The present specimens, the second Japanese record, were captured from shallower depths.

*Sagamichthys abei* Parr, 1953 [Japanese name: Hanameiwashi]

St-108: NSMT-P 58467 (1), 22.0 cm SL. 39°02.0'N, 650-677 m depths.

Order Stomiiformes  
Family Gonostomatidae

*Diplophos orientalis* Matsubara, 1940 [Japanese name: Yumehadaka]

St-100: NSMT-P 58461 (1), 23.0 cm SL. 39°00.1'N, 550-578 m depths

*Gonostoma atlanticum* Norman, 1930 [Japanese name: Tsumariyokoeso]

St-100: NSMT-P 58653 (1), 4.8 cm SL; St-103: NSMT-P 58654 (1), 5.3 cm SL. 38.58.4'N-39°00.1'N, 550-627 m depths.

*Sigmops elongatum* (Günther, 1878) [Japanese name: Ooyokoeso] (38°58.4'N-40°43.4'N, 60-677 m depths)

St-21: NSMT-P 59008 (1), 21.2 cm SL; St-45: NSMT-P 59007 (1), 14.2 cm SL; St-96: NSMT-P 59001 (2), 14.6-14.9 cm SL, NSMT-P 59010 (1), 15.7 cm SL; St-103: NSMT-P 59003 (6), 17.7-21.0 cm SL; St-104: NSMT-P 59002 (1), 18.5 cm SL; St-108: NSMT-P 59009 (1), 18.5 cm SL.

*Sigmops gracile* (Günther, 1878) [Japanese name: Yokoeso]

St-12: NSMT-P 58448 (1), 11.2 cm SL; St-27: NSMT-P 58449 (1), 11.6 cm SL; St-96: NSMT-P 58452 (26), 3.9-12.1 cm SL; St-103: NSMT-P 58451 (14), 5.0-13.5 cm SL; St-107: NSMT-P 58453 (25), 6.4-13.1 cm SL. 38°58.4'N-40°57.4'N, 210-627 m depths.

Family Sternoptychidae

*Argyropelecus aculeatus* Valenciennes in Cuvier and Valenciennes, 1850 [Japanese name: Togarimuneeso]

St-93: NSMT-P 58674 (2), 3.6-3.7 cm SL; St-96: NSMT-P 58673 (6), 2.8-4.4 cm SL; St-97: NSMT-P 58675 (2), 3.3-4.9 cm SL; St-101: NSMT-P 58679 (1), 3.1 cm SL; St-102: NSMT-P 58376 (1), 3.1 cm SL; St-103: NSMT-P 58677 (1), 3.4 cm SL; St-107: NSMT-P 59022 (9), 2.0-5.6 cm SL; St-108: NSMT-P 58678 (3), 1.4-2.7 cm SL. 38°57.9'N-39°06.1'N, 160-679 m depths.

*Argyropelecus affinis* Garman, 1899 [Japanese name: Nagamuneeso]

St-101: NSMT-P 58409(1), 5.9 cm SL; St-103: NSMT-P 59021 (1), 4.3 cm SL. 38°57.9'N-38°58.4'N, 450-627 m.

*Maurollicus japonicus* Ishikawa, 1915 [Japanese name: Kyuurieso]

St-33: NSMT-P 58647 (1), 4.1 cm SL; St-45: NSMT-P 58651 (4), 2.8-3.1 cm SL; St-96: NSMT-P 58649 (1), 3.3 cm SL; St-100: NSMT-P 58648 (1), 3.4 cm SL; St-103: NSMT-P 58650 (2), 3.2-3.5 cm SL. 38°58.4'N-40°01.2'N, 60-627 m depths.

*Polyipnus matsubarai* Schultz, 1961 [Japanese name: Hoshihouneneso]

St-45: MIMB 3205 (1), 7.0 cm SL; St-93: NSMT-P 58672 (2), 3.1-3.4 cm SL; St-96: NSMT-P 58669 (3), 2.6-3.6 cm SL; St-100: NSMT-P 58671 (2), 2.6-2.7 cm SL; St-104: NSMT-P 58668 (3), 2.7-7.2 cm SL; St-107: NSMT-P 58670 (1), 2.4 cm SL; St-108: MIMB 3206 (4), 2.3-3.3 cm

SL. 39°00.1'N-40°01.2'N, 60-677 m depths.

*Sternoptyx diaphana* Hermann, 1781 [Japanese name: Muneeso]

St-18: NSMT-P 58932 (2), 3.2-3.6 cm SL; St-27: NSMT-P 58931 (1), 3.5 cm SL; St-59: NSMT-P 58927 (1), 4.4 cm SL; St-60: NSMT-P 58928 (3), 2.9-3.8 cm SL; St-103: NSMT-P 58929 (29), 1.5-3.7 cm SL; St-108: NSMT-P 58930 (46), 1.7-4.1 cm SL. 38°58.4'N-41°16.7'N, 600-677 m depths.

*Sternoptyx pseudobscura* Baird, 1971 [Japanese name: Muneesomodoki]

St-2: NSMT-P 58682 (1), 5.8 cm SL; St-12: NSMT-P 58681 (1), 6.2 cm SL; St-39: NSMT-P 58684 (1), 5.4 cm SL; St-60: NSMT-P 58983 (1), 4.9 cm SL; St-102: NSMT-P 58685 (1), 6.4 cm SL, NSMT-P 58686 (3), 5.6-6.7 cm SL; St-103: NSMT-P 58680 (1), 5.2 cm SL; St-107: MIMB 3203 (1), 5.4 cm SL; St-108: MIMB 3204 (1), 5.8 cm SL. 38°58.4'N-41°02.2'N, 320-679 m depths.

#### Family Phosichthyidae

*Ichthyococcus elongatus* Imai, 1941 [Japanese name: Shinjueso]

St-18: NSMT-P 58970 (1), 6.6 cm SL; St-34: MIMB 3209 (1), 14.0 cm SL; St-96: NSMT-P 58969 (103), 2.8-9.7 cm SL; St-99: MIMB 3210 (3), 4.0-12.7 cm SL; St-101: NSMT-P 58966 (5), 4.4-14.0 cm SL; St-102: NSMT-P 58967(5), 3.5-10.5 cm SL; St-103: NSMT-P 58965 (1), 10.1 cm SL; St-104: MIMB 3211 (2), 12.6-13.4 cm SL; St-108: NSMT-P 58968 (4), 4.1-11.8 cm SL. 38°57.9'N-41°16.7'N, 210-679 m depths.

*Vinciguerrria nimbaria* (Jordan and Williams in Jordan and Starks, 1895) [Japanese name: Yabeukieso]

St-96: NSMT-P 58645 (2), 2.5-3.7 cm SL; St-104: NSMT-P 58944(1), 2.9 cm SL; St-107: NSMT-P58952(3), 2.6-3.8 cm SL; St-108: NSMT-P58646(4), 3.3-3.5 cm SL. 39°01.6'N-39°06.1'N, 210-677 m depths.

#### Family Stomiidae

*Astronesthes indica* Brauer, 1902 [Japanese name: Hohojirotokagegisu]

St-93: NSMT-P 58401 (1), 7.7 cm SL. 39°02.4'N, 160-188 m depths.

*Astronesthes indopacificus* Parin and Borodulina, 1977 [Japanese name: Kurotokagegisu]

St-96: NSMT-P 58407 (1), 6.8 cm SL; St-104: NSMT-P 58408 (1), 6.8 cm SL. 39°04.1'N-39°06.1'N, 210-579 m depths.

*Bathophilus pawneeii* Parr, 1927 [Japanese name: Hosogingaeso]

St-98: NSMT-P 58454 (1), 11.7 cm SL. 39°02.2'N, 450-478 m depths.

*Borostomias pacificus* (Imai, 1941) [Japanese name: Futatsuboshihoshieso]

St-98: NSMT-P 58405 (1), 13.8 cm SL. 39°02.2'N, 450-478 m depths.

*Chauliodus macouni* Bean, 1890 [Japanese name: Higashihouraesio]

St-2: NSMT-P 58983 (1), 15.5 cm SL; St-11: NSMT-P 58984 (4), 19.5-23.2 cm SL; St-12: NSMT-P 58982 (1), 14.5 cm SL; St-14: NSMT-P 58986 (6), 13.3-27.7 cm SL; St-38: NSMT-P

59006 (1), 29.6 cm SL; St-80: NSMT-P 58987 (4), 20.9-22.5 cm SL. 39°59.4'N-41°11.9'N, 550-658 m depths.

***Chauliodus sloani*** Bloch and Schneider, 1801 [Japanese name: Houraieso]

St-25: NSMT-P 58989 (1), 18.9 cm SL; St-80: NSMT-P 58988 (1), 18.7 cm SL. 40°02.6'N, 41°11.9'N, 550-626 m depths.

***Echiostoma barbatum*** Lowe, 1843 [Japanese name: Murasakihoshieso]

St-95: NSMT-P 58427 (1), 24.1 cm SL. 39°04.1'N, 25-55 m depths.

***Heterophotus ophistoma*** Regan and Trewavas, 1929 [Japanese name: Ootokagehadaka]

St-98: NSMT-P 58460 (1), 20.6 cm SL. 39°02.2'N, 450-478 m depths.

***Iliacanthus antrostomus*** Gilbert, 1890 [Japanese name: Mitsumatayariuo]

St-11: NSMT-P 58404 (1), 38.5 cm SL; St-24: NSMT-P 58414 (1), 38.8 cm SL; St-39: NSMT-P 59011 (1), 41.5 cm SL; St-107: NSMT-P 58423 (1), 39.8 cm SL; St-108: NSMT-P 59012 (1), 40.5 cm SL. 39°01.6'N-41°00.5'N, 550-677 m depths.

***Leptostomias multifilis*** Imai, 1941 [Japanese name: Yarihoshieso]

St-103: NSMT-P 58797 (1), 21.5 cm SL. 38°58.4'N, 600-627 m depths.

***Macrostomias pacificus*** Fedorov and Melchikova, 1971 [Japanese name: Hosowanitokagegisu]

St-45: NSMT-P 58400 (1), 22.4 cm SL; St-98: NSMT-P 58406 (1), 18.4 cm SL; St-107: NSMT-P 58407 (1), 20.0 cm SL. 39°01.6'N-40°01.2'N, 60-578 m depths.

***Malacosteus niger*** Ayres, 1848 [Japanese name: Ookuchihoshieso]

St-35: NSMT-P 58426 (1), 16.9 cm SL; St-39: NSMT-P 58413 (1), 12.8 cm SL; St-80: NSMT-P 58418 (1), 10.9 cm SL; St-102: NSMT-P 58415 (2), 13.1-15.8 cm SL; St-104: NSMT-P 58475 (1), 11.5 cm SL; St-108: NSMT-P 58410 (2), 5.5-13.5 cm SL. 39°00.2'N-41°11.9'N, 550-679 m depths.

***Melanostomias melanops*** Brauer, 1902 [Japanese name: Shirohigehoshieso]

St-93: NSMT-P 58419 (1), 13.9 cm SL. 39°02.4'N, 60-188 m depths.

***Melanostomias pauciradius*** Matsubara, 1938 [Japanese name: Kantentokagegisu]

St-99: NSMT-P 58470 (1), 21.2 cm SL, 650-677 m; St-105: MIMB 3216 (1), 19.8 cm SL. 39°00.6'N-39°02.6'N, 0-677m depths.

***Opostomias mitsuui*** Imai, 1941 [Japanese name: Mitsuihoshieso]

St-15: NSMT-P 58744 (1), 31.0 cm SL; St-25: NSMT-P 58773 (2), 13.6-18.2 cm SL; St-36: NSMT-P 58745 (1), 33.0 cm SL; St-47: NSMT-P 58746 (2), 29.3-32.0 cm SL; St-95: NSMT-P 58949 (1), 8.1 cm SL; St-96: NSMT-P 58774 (3), 11.2-33.0 cm SL; St-98: NSMT-P 58853 (2), 30.5-31.7 cm SL; St-100: NSMT-P 58735 (2), 25.5-31.0 cm SL; St-101: NSMT-P 58733 (7), 7.2-32.5 cm SL; St-102: NSMT-P 58736 (2), 7.3-32.3 cm SL; St-107: NSMT-P 58852 (3), 5.1-5.7 cm SL; St-108: NSMT-P 58739 (1), 26.0 cm SL. 38°57.9'N-41°03.3'N, 25-679 m depths.

***Pachystomias microdon*** (Günther, 1878) [Japanese name: Kurenaihoshieso]

St-99: NSMT-P 58969 (2), 10.6-11.2 cm SL; St-100: MIMB 3212 (1), 14.0 cm SL; St-101:

NSMT-P 58412 (1), 7.5 cm SL; St-102: NSMT-P 58430 (2), 10.9–14.2 cm SL; St-103: NSMT-P 58428 (4), 11.5–19.0 cm SL; St-104: MIMB 3213 (6), 9.0–12.5 cm SL; St-107: NSMT-P 58403 (1), 10.6 cm SL. 38°57.9'N–39°04.1'N, 450–679 m depths.

*Photostomias guernei* Collett, 1889 [Japanese name: Houkiboshieso]

St-104: NSMT-P 58420 (2), 12.5–13.4 cm SL; St-108: NSMT-P 58402 (1), 10.8 cm SL. 39°02.0'N–39°04.1'N, 550–677 m depths.

*Photonectes margarita* Goode and Bean, 1896 [Japanese name: Hiregurohoteieso]

St-103: NSMT-P 58422 (2), 13.5–17.2 cm SL. 38°58.4'N, 600–627 m depths.

*Tactostoma macropus* Bolin, 1939 [Japanese name: Hadakahoteieso]

St-2: NSMT-P 59000 (1), 29.5 cm SL; St-11: NSMT-P 58998 (1), 32.6 cm SL; St-14: NSMT-P 58999 (1), 35.9 cm SL. 41°00.2'N–41°02.2'N, 630–658 m depths.

Order Aulopiformes  
Family Scopelarchidae

*Benthalbella dentata* (Chapman, 1939) [Japanese name: Tsumaridemeeso]

St-1: NSMT-P 58846 (1), 20.9 cm SL; St-11: NSMT-P 58747 (1), 22.7 cm SL; St-12: NSMT-P 58845 (1), 16.2 cm SL; St-14: NSMT-P 58847 (3), 14.1–20.8 cm SL; St-80: MIMB 3219 (7), 12.0–22.7 cm SL; St-99: NSMT-P 58830 (2), 22.7–23.6 cm SL; St-100: NSMT-P 58842 (2), 21.9–23.7 cm SL; St-103: NSMT-P 58844 (2), 21.3–22.0 cm SL, NSMT-P 58937 (1), 12.7 cm SL; St-104: NSMT-P 58748 (3), 21.0–22.8 cm SL; St-107: NSMT-P 58841 (5), 21.5–25.5 cm SL. 38°58.4'N–41°11.9'N, 530–677 m depths.

*Benthalbella linguidentis* (Mead and Böhlke, 1953) [Japanese name: Demeeso]

St-1: 58936 (2), 30.2–31.8 cm SL; St-60: NSMT-P 58934 (1), 10.3 cm SL; St-80: MIMB 3220 (5), 29.8–30.6 cm SL; St-96: NSMT-P 58887 (16), 4.4–5.7 cm SL; St-101: NSMT-P 58833 (2), 29.7–30.1 cm SL; St-103: NSMT-P 58935 (1), 7.7 cm SL; St-104: NSMT-P 58933 (1), 8.0 cm SL. 38°57.9'N–41°11.9'N, 210–677 m depths.

*Scopelarchus analis* (Brauer, 1902) [Japanese name: Demeesodamashi]

St-60: NSMT-P 58507 (1), 7.4 cm SL; St-102: NSMT-P 58506 (3), 5.1–7.7 cm SL; St-107: NSMT-P 58508 (1), 4.4 cm SL. 39°00.2'N–41°01.1'N, 650–679 m depths.

*Scopelarchus michaelsarsi* Koefoed, 1955 [Japanese name: Mikaerudemeeso]

St-107: NSMT-P 58509 (1), 4.2 cm SL. 39°01.6'N, 550–578 m depths.

Family Notosudidae

*Scopelosaurus adleri* (Fedorov, 1967) [New Japanese name: Sankakufudeeso] (Fig. 3C)

St-39: NSMT-P 58849 (1), 20.5 cm SL; St-80: NSMT-P 58916 (1), 15.4 cm SL; St-102: NSMT-P 58829 (2), 20.9–21.0 cm SL; St-103: MIMB 2215 (1), 8.5 cm SL. 38°58.4'N–40°18.2'N, 600–679 m depths.

*Description.* Dorsal fin 10–11; anal fin 17–20; pectoral fin 10–13; pelvic fin 8–10; vertebrae 58–61. Body cross section behind head triangular. Interorbital space wide and almost flattened. Eye oval, its posterior end at middle of head. Pupil horizontally elongated. Mouth large, its

posterior end reaching at or beyond a vertical line through posterior margin of orbit in largest specimens (20 cm SL) but not reaching there in small specimens (11.6 and 15.4 cm SL). Snout long, sharply pointed. Teeth in both jaws small and recurved; uniserial on upper and biserial on lower. Vomer and palatine teeth small; a few on vomer and uniserial (anteriorly) and biserial (posteriorly) on palatine. Gill rakers long. Dorsal fin origin at middle of body. Pectoral fin elongated, its base at mid-height of body. Adipose fin above posterior part of anal fin base. Anus just behind pelvic fin. Caudal fin forked.

*Remarks.* A more detailed description and biological information for *Scopelosaurus adleri* were published by Balanov and Savinykh (1999) who gave the first collection records from Japanese waters.

***Scopelosaurus harryi*** (Mead *in* Mead and Taylor, 1953) [Japanese name: Hariifudeeso]

St-18: NSMT-P 58911 (1), 11.3 cm SL; St-31: NSMT-P 58831 (3), 19.9–21.0 cm SL; St-32: NSMT-P 58843 (2), 7.1–21.0 cm SL; St-35: NSMT-P 58910 (1), 8.5 cm SL; St-45: NSMT-P 58850 (2), 19.8–21.0 cm SL; St-47: NSMT-P 58938 (1), 4.3 cm SL; St-96: NSMT-P 58915 (32), 4.0–7.4 cm SL; St-99: NSMT-P 58912 (1), 6.0 cm SL; St-100: NSMT-P 58914 (5), 4.6–7.0 cm SL; St-102: NSMT-P 58939 (1), 9.5 cm SL; St-103: NSMT-P 58908 (8), 7.5–8.3 cm SL; St-104: NSMT-P 58909 (1), 7.8 cm SL; St-107: NSMT-P 58948 (3), 3.5–7.2 cm SL; St-108: NSMT-P 58913 (5), 4.1–7.3 cm SL. 38°58.4'N–41°16.7'N, 25–679 m depths.

#### Family Paralepididae

***Lestidiops ringens*** (Jordan and Gilbert, 1880) [Japanese name: Kitanamehadaka]

St-30: MIMB 3228 (1), 23.7 cm SL; St-32: NSMT-P 58834 (1) 21.0 cm SL; St-35: NSMT-P 58851 (1), 24.0 cm SL; St-37: MIMB 3229 (1), 25.2 cm SL. 39°59.5'N–40°01.9'N, 60–657 m depths.

***Lestidiops sphyraenopsis*** Hubbs, 1916 [Japanese name: Yasehadakaeso]

St-26: NSMT-P 58805 (3), 28.3–34.0 cm SL; St-31: NSMT-P 58804 (2), 8.2–25.8 cm SL; St-93: MIMB 3224 (1), 32.4 cm SL; St-94: MIMB 3225 (12), 11.0–13.5 cm SL; St-95: NSMT-P 58776 (1), 14.2 cm SL; St-96: NSMT-P 58775 (1), 12.4 cm SL, MIMB 3226 (6), 26.9–34.6 cm SL; St-98: NSMT-P 58779 (3), 11.5–15.0 cm SL; St-99: NSMT-P 58780 (1), 11.4 cm SL; St-100: NSMT-P 58778 (5), 8.0–14.5 cm SL; St-101: NSMT-P 58781 (2), 12.6–13.6 cm SL; St-102: NSMT-P 58808 (2), 26.5–34.3 cm SL; St-103: NSMT-P 58806 (3), 29.5–30.0 cm SL; St-104: MIMB 3227 (3), 29.4–37.2 cm SL; St-107: NSMT-P 58777(1), 10.0 cm SL, NSMT-P 58803 (1), 27.5 cm SL; St-108: NSMT-P 58802 (1), 25.3 cm SL. 38°57.9'N–40°01.0'N, 25–679 m depths.

***Lestidiops jayakari*** (Boulenger, 1889) [Japanese name: Shironamehadaka]

St-100: NSMT-P 58783 (1), 8.5 cm SL; St-102: NSMT-P 58782 (1), 8.0 cm SL; St-103: NSMT-P 58785 (2), 7.1–8.0 cm SL; St-104: MIMB 3230 (3), 8.7–9.2 cm SL. 38°58.4'N–39°04.1'N, 550–679 m depths.

***Lestrolepis intermedia*** (Poey, 1868) [Japanese name: Futasujinamehadaka]

St-96: NSMT-P 58790 (2), 6.4–7.6 cm SL; St-99: NSMT-P 58787 (1), 10.0 cm SL; St-100: NSMT-P 58786 (3), 7.5–10.3 cm SL; St-102: NSMT-P 58788 (1), 11.5 cm SL; St-108: NSMT-P 58789 (1), 9.3 cm SL. 39°00.1'N–39°06.1'N, 210–679 m depths.

***Magnisudis atlantica*** (Krøyer, 1868) [Japanese name: Kusabiurokoeso]



St-35: NSMT-P 58796 (1), 5.8 cm SL; St-36: NSMT-P 58795 (1), 8.7 cm SL; St-39: MIMB 3221 (4), 6.3-14.6 cm SL; St-47: NSMT-P 58797 (2), 6.7-7.0 cm SL; St-96: NSMT-P 58798 (1), 10.4 cm SL; St-97: MIMB 3222 (1), 14.2 cm SL; St-99: NSMT-P 58801 (9), 6.0-10.3 cm SL; St-100: NSMT-P 58799 (3), 5.0-6.6 cm SL; St-102: MIMB 3223 (3), 6.2-9.0 cm SL; St-103: NSMT-P 58800 (2), 5.4-6.3 cm SL. 38°58.4'N-40°18.2'N, 210-679 m depths.

*Arctozenus risso* (Bonaparte, 1840) [Japanese name: Hikarieso]

St-1: NSMT-P 59294 (1), 26.0 cm SL; St-39: NSMT-P 59295 (2), 24.6-26.2 cm SL; St-107: NSMT-P 59296 (1), 24.0 cm SL. 39°01.6'N-40°58.9'N, 530-657 m depths.

*Remarks.* We followed Mecklenburg *et al.* (2002) for the scientific name.

#### Family Anotopteridae

*Anotopterus pharao* Zugmayer, 1911 [Japanese name: Mizuuodamashi]

39°02.9'N-41°43.2'N, 550-677 m depths.

*Remarks.* Voucher specimens were not kept, but this species was recorded from the following stations: St-73 (1 specimen, 63.5 cm SL), St-88 (1 specimen, 90.7 cm SL) and St-108 (1 specimen, 52.8 cm SL).

#### Family Evermannellidae

*Coccorella atlantica* (Parr, 1928) [Japanese name: Yarieso]

St-60: NSMT-P 58565 (1), 10.7 cm SL. 41°01.1'N, 650-677 m depths.

*Odontostomops normalops* (Parr, 1928) [Japanese name: Mukashiyarieso]

St-107: NSMT-P 58566 (1), 5.5 cm SL. 39°01.6'N, 550-578 m depths.

#### Family Alepisauridae

*Alepisaurus ferox* Lowe, 1933 [Japanese name: Mizuuo]

St-36: NSMT-P 59061 (1), 69.3 cm SL; St-47: NSMT-P 59064 (1), 4.8 cm SL; St-102: NSMT-P 59062 (1), 57.6 cm SL, NSMT-P 59063 (1), 44.2 cm SL; St-107: NSMT-P 59062 (1), 59.0 cm SL. 39°00.2'N-40°01.3'N, 530-679 m depths.

#### Order Myctophiformes

##### Family Neoscopelidae

*Neoscopelus macrolepidotus* Johnson, 1863 [Japanese name: Sotooriiwashi]

St-108: MIMB 3235 (1), 12.8 cm SL. 39°02.0'N, 650-677 m depths.

*Scopelengys tristis* Alcock, 1890 [Japanese name: Kurogoiwashi]

St-52: NSMT-P 59238 (1), 14.8 cm SL; St-104: NSMT-P 59239 (1), 15.2 cm SL. 39°04.1'N-41°00.0'N, 550-579 m depths.

##### Family Myctophidae

*Bolinichthys distophax* Johnson, 1975 [Japanese name: Futomikazukihadaka]

St-60: NSMT-P 58525 (1), 8.1 cm SL; St-77: NSMT-P 58517 (1), 8.4 cm SL; St-86: NSMT-P

58518 (1), 8.2 cm SL; St-100: NSMT-P 58520 (2), 4.9–8.0 cm SL; St-101: NSMT-P 58521 (3), 4.1–5.2 cm SL; St-102: NSMT-P 58519 (1), 4.9 cm SL; St-107: NSMT-P 58523 (1), 3.9 cm SL; St-108: NSMT-P 58522 (2), 3.9–5.8 cm SL. 38°57.9'N–41°25.9'N, 450–679 m depths.

***Bolinichthys longipes*** (Brauer, 1906) [Japanese name: Hosomikazukihadaka]  
St-96: NSMT-P 58524 (1), 5.3 cm SL. 39°06.1'N, 210–240 m depths.

***Diaphus mollis*** Tåning, 1928 [Japanese name: Otoomehadaka]  
St-96: NSMT-P 59249 (5), 2.4–3.1 cm SL. 39°06.1'N, 210–240 m depths.

***Diaphus perspicillatus*** (Ogilby, 1898) [Japanese name: Shirohanahadaka]  
St-96: NSMT-P 59248 (1), 3.2 cm SL. 39°06.1'N, 210–240 m.

***Diaphus theta*** Eigenmann and Eigenmann, 1890 [Japanese name: Todohadaka]  
St-39: NSMT-P 58727 (1), 6.5 cm SL. 40°18.2'N, 630–657 m depths.

***Electrona risso*** (Cocco, 1829) [Japanese name: Darumahadaka]  
St-108: NSMT-P 58816 (1), 4.2 cm SL. 39°02.0'N, 650–677 m depths.

***Lampadena luminosa*** (Garman, 1899) [Japanese name: Kagamiiwashi]  
St-25: NSMT-P 58770 (1), 14.3 cm SL; St-26: NSMT-P 58771 (1), 21.3 cm SL; St-48: NSMT-P 58837 (1), 20.6 cm SL. 40°01.0'N–40°02.6'N, 530–626 m depths.

***Lampadena urophaos*** Paxton, 1963 [Japanese name: Hotarubihadaka]  
St-25: NSMT-P 58769 (1), 19.7 cm SL; St-26: NSMT-P 58768 (2), 11.8–12.7 cm SL; St-48: NSMT-P 58838 (1), 15.5 cm SL; St-61: NSMT-P 58767 (8), 11.3–14.8 cm SL; St-78: NSMT-P 58766 (1), 14.3 cm SL; St-86: NSMT-P 58765 (1), 14.1 cm SL. 40°01.0'N–41°21.2'N, 500–658 m depths.

***Lampanyctus acanthurus*** Wisner, 1974 [Japanese name: Oomenijihadaka]  
St-27: NSMT-P 58516 (5), 8.9–9.1 cm SL; St-31: NSMT-P 58515 (1), 5.2 cm SL; St-98: NSMT-P 58511 (2), 11.3–12.5 cm SL; St-100: NSMT-P 58514 (3), 9.0–11.8 cm SL; St-101: NSMT-P 58513 (2), 7.6–10.8 cm SL; St-104: NSMT-P 58512 (1), 10.3 cm SL; St-107: NSMT-P 58510 (1), 11.3 cm SL. 38°57.9'N–40°00.3'N, 25–579 m depths.

***Lampanyctus jordani*** Gilbert, 1913 [Japanese name: Mamehadaka]  
St-34: NSMT-P 58822 (2), 5.6–6.1 cm SL; St-39: NSMT-P 58824 (1), 11.5 cm SL; St-45: NSMT-P 58823 (1), 6.7 cm SL; St-60: NSMT-P 58772 (6), 6.3–10.0 cm SL; St-61: NSMT-P 58839 (12), 6.7–11.9 cm SL; St-78: NSMT-P 58840 (4), 7.1–8.4 cm SL. 39°59.9'N–41°21.2'N, 60–677 m depths.

***Lampanyctus nobilis*** Tåning, 1928 [Japanese name: Hosotongarihadaka]  
St-27: NSMT-P 58575 (1), 12.0 cm SL; St-60: NSMT-P 58577 (1), 8.3 cm SL; St-101: NSMT-P 58576 (2), 8.6–11.3 cm SL; St-103: NSMT-P 58574 (1), 9.7 cm SL; St-104: NSMT-P 58573 (1), 10.2 cm SL. 38°57.9'N–41°01.1'N, 450–677 m depths.

***Lampanyctus simulator*** Wisner, 1971 [Japanese name: Hosomamehadaka]  
St-100: NSMT-P 58871 (1), 9.2 cm SL; St-104: NSMT-P 58567 (1), 8.6 cm SL.

39°00.1'N-39°04.1'N, 550-579 m.

*Lampanyctus steinbecki* Bolin, 1939 [Japanese name: Sustainhadaka]

St-101: NSMT-P 58828 (1), 10.8 cm SL; St-102: NSMT-P 58827 (2), 8.7-9.7 cm SL; St-104: NSMT-P 58568 (2), 6.2-8.5 cm SL. 38°57.9'N-39°04.1'N, 450-679 m depths.

*Lampanyctus tenuiformis* Brauer, 1906 [Japanese name: Netaijihadaka]

St-35: NSMT-P 58818 (1), 10.0 cm SL; St-78: NSMT-P 58821 (1), 14.5 cm SL; St-100: NSMT-P 58819 (4), 9.9-13.3 cm SL; St-101: NSMT-P 58820 (4), 6.0-10.7 cm SL; St-104: NSMT-P 58569 (1), 7.3 cm SL. 38°57.9'N-41°21.2'N, 450-657 m depths.

*Myctophum asperum* Richardson, 1845 [Japanese name: Aarahadaka]

St-35: NSMT-P 59242 (1), 6.8 cm SL; St-104: NSMT-P 59243 (2), 7.0-7.3 cm SL. 39°04.1'N-40°01.9'N, 550-657 m depths.

*Myctophum nutidulum* Garman, 1899 [Japanese name: Susukihadaka]

St-60: NSMT-P 58564 (1), 6.4 cm SL. 41°01.1'N, 650-677 m depths.

*Myctophum orientale* (Gilbert, 1913) [Japanese name: Ushadaka]

St-102: NSMT-P 58815 (1), 6.8 cm SL. 39°00.2'N, 650-679 m depths.

*Nannobranchium nigrum* Günther, 1887 [Japanese name: Tongarihadaka]

St-107: NSMT-P 58570 (1), 7.5 cm SL. 39°01.6'N, 550-578 m depths)

*Nannobranchium regale* (Gilbert, 1892) [Japanese name: Mikadohadaka]

St-39: NSMT-P 58825 (1), 15.5 cm SL; St-61: NSMT-P 58832 (10), 11.1-14.8 cm SL; St-102: NSMT-P 58826 (1), 9.1 cm SL. 39°00.2'N-40.59.4'N, 500-679 m depths.

*Notoscopelus japonicus* (Tanaka, 1908) [Japanese name: Ookuchiiwashi]

St-39: NSMT-P 58810 (1), 13.0 cm SL. 40°18.2'N, 630-657 m depths.

*Notoscopelus resplendens* (Richardson, 1945) [Japanese name: Isaribihadaka]

St-39: NSMT-P 58817 (1), 7.8 cm SL. 40°18.2'N, 630-657 m.

*Protomyctophum thompsoni* (Chapman, 1944) [Japanese name: Oomehadaka]

St-12: NSMT-P 58514 (8), 3.6-4.6 cm SL; St-54: NSMT-P 59241 (3), 4.1-4.5 cm SL. 40°57.4'N-41°00.0'N, 550-677 m.

*Stenobranchius leucopsarus* (Eigenmann and Eigenmann, 1890) [Japanese name: Kohire-hadaka]

St-39: NSMT-P 58809 (1), 10.6 cm SL; St-54: NSMT-P 59246 (2), 7.9-9.1 cm SL. 40°18.2'N-41°00.0'N, 630-677 m.

*Stenobranchius nannochir* (Gilbert, 1890) [Japanese name: Sekkihadaka]

St-39: NSMT-P 59247 (1), 9.5 cm SL. 40°18.2'N, 630-657 m.

*Symbolophorus californiensis* (Eigenmann and Eigenmann, 1889) [Japanese name: Naga-hadaka]

St-39: NSMT-P 58811 (1), 10.4 cm SL. 40°18.2'N, 630-657 m depths.

***Taaningichthys minimus*** (Tåning, 1928) [Japanese name: Kurohadaka]

St-103: NSMT-P 58560 (1), 6.3 cm SL; St-104: NSMT-P 58561 (1), 4.2 cm SL; St-108: NSMT-P 58563 (1), 5.5 cm SL. 38°58.4'N-39°04.1'N, 550-677 m depths.

***Tarletonbeania taylori*** Mead, 1953 [Japanese name: Hokuyouhadaka]

St-33: NSMT-P 59240 (3), 7.0-7.5 cm SL. 39°56.9'N, 320-347 m.

## Order Lampriformes

## Family Trachipteridae

***Desmodema lorum*** Rosenblatt and Butler, 1977 [Japanese name: Okifurisodeuo]

St-26: NSMT-P 58742 (1), 102.5 cm TL; St-27: NSMT-P 58741 (2), 76.5-82.7 cm TL; St-47: NSMT-P 58641 (1), 84.7 cm TL; St-61: NSMT-P 58743 (1), 76.0 cm TL; St-62: NSMT-P 58640 (1), 55.0 cm TL; St-93: NSMT-P 58740 (1), 41.5 cm TL; St-104: NSMT-P 58639 (1), 47.0 cm TL. 39°02.4'N-41°01.5'N, 160-579 m depths.

***Trachipterus trachipterus*** (Gmelin, 1789) [Japanese name: Tengaihata]

St-26: NSMT-P 58642 (1), 69.3 cm SL. 40°01.0'N, 530-556 m depths.

## Order Gadiformes

## Family Macrouridae

***Coryphaenoides pectoralis*** (Gilbert, 1879) [Japanese name: Munedara]

St-14: NSMT-P 59299 (2), 36.0 (+)-46.0 (+) cm TL; St-35: NSMT-P 58885 (4), 7.7 (+)-3.1 (+) cm TL; St-38: NSMT-P 58945 (1), 9.2 (+) cm TL; St-39: NSMT-P 58884 (3), 6.6 (+)-12.0 (+) cm SL; St-54: NSMT-P 59300 (2), 27.1 (+)-28.7 (+) cm TL; St-102: NSMT-P 58946 (1), 10.5 (+) cm TL; St-104: NSMT-P 58944 (1), 9.4 (+) cm TL. 39°00.2'N-41°00.2'N, 550-679 m depths.

## Family Moridae

***Laemonema longipes*** Schmidt, 1938 [Japanese name: Itohikidara]

St-36: NSMT-P 58624 (1), 6.8 cm SL, NSMT-P 58625 (2), 4.5-4.6 cm SL. 40°01.2'N, 530-557 m depths.

***Physiculus japonicus*** Hilgendorf, 1879 [Japanese name: Chigodara]

St-36: NSMT-P 59297 (1), 5.0 cm SL; St-39: NSMT-P 59298 (1), 4.6 cm SL; St-102: NSMT-P 58627 (1), 5.3 cm SL; St-104: NSMT-P 58626 (1), 5.2 cm SL; St-108: NSMT-P 58628 (1), 4.9 cm SL. 39°00.2'N-40°18.2'N, 550-679 m depths.

## Family Melanonidae

***Melanonus zugmayeri*** Norman, 1930 [Japanese name: Kawarihiredara]

St-99: NSMT-P 58612 (2), 9.1-13.7 cm SL; St-100: NSMT-P 58610 (3), 5.9-13.8 cm SL; St-101: NSMT-P 58613 (2), 5.4-6.4 cm SL; St-102: MIMB 3238 (24), 6.4-14.4 cm SL; St-104: NSMT-P 58611 (8), 6.4-13.7 cm SL; St-107: NSMT-P 58614 (2), 6.3-6.5 cm SL; St-108: NSMT-P 58540 (2), 6.7-19.0 cm SL. 38°57.9'N-39°04.1'N, 450-679 m depths.

## Family Bregmacerotidae

*Bregmaceros japonicus* Tanaka, 1908 [Japanese name: Saiuo]

St-50: NSMT-P 59014 (1), 9.5 cm SL; St-99: NSMT-P 58629 (1), 7.5 cm SL; St-103: NSMT-P 59013 (2), 9.3-9.5 cm SL; St-104: NSMT-P 58543 (1), 8.0 cm SL. 38°58.4'N-41°01.1'N, 440-677 m depths.

## Order Lophiiformes

## Family Ogcocephalidae

*Coelophrys bradburyae* Endo and Shinohara, 1999 [Japanese name: Wakatakayumesokogutsu]

St-104: NSMT-P 59255 (1), 4.0 cm SL. 39°01.1'N, 550-579 m depths.

*Remarks.* This is the second collection record for *Coelophrys bradburyae*. The holotype was collected from 557-595 m depths off Hachinohe, Iwate Prefecture, Japan (Endo and Shinohara, 1999).

## Family Melanocetidae

*Melanocetus johnsoni* Günther, 1864 [Japanese name: Perikan-ankou]

St-103: NSMT-P 58616 (1), 1.6 cm SL. 38°58.4'N, 600-627 m depths.

## Family Himantolophidae

*Himantolophus sagamius* (Tanaka, 1918) [Japanese name: Chouchinankou]

St-21: NSMT-P 59015 (1), 8.0 cm SL; St-102: NSMT-P 58536 (1), 6.9 cm SL. 39°00.2'N-40°43.4'N, 530-679 m depths.

*Remarks.* Nakabo (2002) used *Himantolophus groenlandicus* Reinhardt, 1837 for this species, but we followed Bertelsen and Krefft (1988) here. *H. sagamius* is endemic to Pacific and known from New Guiana, Japan, the Hawaiian Islands, southern California and Ecuador (Bertelsen and Krefft, 1988; Mundy, 2005).

## Family Oneirodidae

*Bertella idiomorpha* Pietsch, 1973 [Japanese name: Baterusenankou]

St-35: NSMT-P 58700 (1), 3.8 cm SL; St-36: NSMT-P 58695 (1), 5.7 cm SL; St-37: NSMT-P 58697 (1), 5.8 cm SL; St-38: MIMB 3241 (1), 6.8 cm SL; St-47: NSMT-P 58696 (1), 5.4 cm SL; St-99: NSMT-P 58638(1), 6.6 cm SL; St-102: NSMT-P 58694 (1), 5.8 cm SL; St-103: NSMT-P 58698 (2), 5.7-6.4 cm SL, NSMT-P 58699 (1), 5.4 cm SL; St-104: MIMB 3242 (1), 6.8 cm SL. 38°58.4'N-40°01.9'N, 450-679 m depths.

*Chaenophryne draco* Beebe, 1932 [Japanese name: Rakudaankou]

St-36: NSMT-P 58541 (1), 5.3 cm SL; St-108: NSMT-P 58632 (1), 5.3 cm SL. 39°02.0'N-40°01.2'N, 530-677 m depths.

*Chaenophryne longiceps* Regan, 1925 [New Japanese name: Kurozumerakudaankou] (Fig. 3B)

St-100: NSMT-P 58581 (1), 2.1 cm SL; St-107: NSMT-P 58544 (1), 3.2 cm SL. 39°00.1'N, 55-578 m depths.

*Description.* Dorsal fin 7; anal fin 5; pectoral fin 18; caudal fin 4 + 5 = 9; vertebrae 10 + 10 =

20. Teeth on upper jaw 21-23, lower jaw 22-35 and vomer 6-8. Illicial length 36.0 % SL. Escal bulb width 6.8 % SL. Sphenotic and angular spines absent. Articular spine reduced. Surface of skull cancellous. Long, retrose teeth on vomer, both jaws. Ratio of number of teeth in upper jaw to lower 0.66-0.95. Esca with two elongate, internally pigmented anterior appendages. One long medial and flattened posterior appendage.

*Remarks.* *Chaenophryne longiceps* is widely distributed in the world oceans (Bertelsen, 1951; Pietsch, 1975). The present specimens are the first record for this species from Japan and the western North Pacific.

***Oneirodes bulbosus*** Chapman, 1939 [Japanese name: Yumeankou]

St-103: NSMT-P 58643 (1), 10.2 cm SL. 38°58.4'N, 600-627 m depths.

***Oneirodes thompsoni*** (Schultz, 1934) [Japanese name: Togerakudaankou]

St-36: NSMT-P 58643 (1), 10.2 cm SL. 40°01.2'N, 530-557 m depths.

#### Family Linophrynidae

***Linophryne indica*** (Brauer, 1902) [Japanese name: Indo-oniankou]

St-101: NSMT-P 58542 (1), 3.6 cm SL. 38°57.9'N, 450-478 m depths.

#### Order Stephanoberyciformes

#### Family Melamphaidae

***Melamphaes lugubris*** Gilbert, 1891 [Japanese name: Honkabutouo]

St-2: NSMT-P 58595 (2), 7.9-8.4 cm SL; St-12: NSMT-P 58594 (1), 8.9 cm SL; St-37: NSMT-P 58596 (2), 4.0-5.8 cm SL; St-99: NSMT-P 58580 (1), 8.5 cm SL; St-100: MIMB 3246 (8), 7.0-8.7 cm SL; St-101: MIMB 3247 (3), 8.2-8.6 cm SL; St-104: NSMT-P 58593 (1), 8.3 cm SL; St-107: NSMT-P 58592 (6), 7.2-8.1 cm SL; St-108: NSMT-P 58597 (2), 7.5-8.5 cm SL. 38°57.9'N-41°02.2'N, 450-677 m depths.

***Melamphaes polylepis*** Ebeling, 1962 [Japanese name: Urokokabutouo]

St-96: NSMT-P 58598 (2), 4.3-4.4 cm SL; St-100: NSMT-P 58603 (2), 3.7-5.0 cm SL; St-102: NSMT-P 58599 (2), 6.6-6.8 cm SL; St-103: MIMB 3248 (4), 4.3-6.7 cm SL; St-104: NSMT-P 58600 (2), 4.4-6.3 cm SL; St-107: NSMT-P 58601 (2), 4.8-6.4 cm SL, NSMT-P 58602 (2), 4.2-6.4 cm SL; St-108: NSMT-P 58604 (1), 4.1 cm SL. 38°58.4'N-39°06.1'N, 210-679 m depths.

***Poromitra crassiceps*** (Günther, 1878) [Japanese name: Kabutouo]

St-39: NSMT-P 58579 (1), 11.5 cm SL; St-80: NSMT-P 58608 (1), 9.1 cm SL; St-100: NSMT-P 58606 (1), 5.4 cm SL; St-101: NSMT-P 58605 (1), 8.7 cm SL; St-102: NSMT-P 58609 (4), 5.0-10.1 cm SL; St-103: NSMT-P 59256 (4), 9.2-11.0 cm SL; St-104: NSMT-P 58607 (2), 5.9-6.7 cm SL. 38°57.9'N-41°11.9'N, 450-679 m depths.

***Scopeloberyx robustus*** (Günther, 1887) [Japanese name: Tatekabutouo]

St-35: NSMT-P 59260 (1), 7.6 cm SL. 40°01.9'N, 630-657 m depths.

#### Family Rondeletiidae

***Rondeletia loricata*** Abe and Hotta, 1963 [Japanese name: Akachokkikujirauo]



St-35: NSMT-P 58693 (2), 5.4-5.5 cm SL; St-38: NSMT-P 58689 (1), 8.2 cm SL; St-39: NSMT-P 58690 (1), 7.9 cm SL; St-59: NSMT-P 58691 (2), 5.1-8.2 cm SL; St-80: NSMT-P 58639 (1), 7.7 cm SL; St-99: NSMT-P 58637 (1), 8.4 cm SL; St-100: NSMT-P 59261 (4), 3.8-8.2 cm SL; St-101: NSMT-P 58692 (1), 4.3 cm SL; St-104: NSMT-P 59262 (4), 4.0-7.8 cm SL. 38°57.9'N-41°11.9'N, 450-677 m depths.

Family Barbourisiidae

*Barbourisia rufa* Parr, 1945 [Japanese name: Akakujirauodamashi]

St-28: NSMT-P 59018 (1), 15.3 cm SL; St-37: NSMT-P 59017 (1), 23.8 cm SL; St-54: NSMT-P 58635 (1), 22.0 cm SL; St-59: NSMT-P 58634 (2), 24.0-26.0 cm SL. 40°00.1'N-41°02.6'N, 450-677 m depths.

Order Beryciformes

Family Anoplogastridae

*Anoplogaster cornuta* (Valenciennes in Cuvier and Valenciennes, 1833) [Japanese name: Onikinme]

St-99: NSMT-P 58687 (1), 9.0 cm SL; St-102: NSMT-P 58688 (5), 8.1-13.4 cm SL. 39°00.2'N-39°00.6'N, 650-679 m depths.

Family Diretmidae

*Diretmoides parini* Post and Quero, 1981 [Japanese name: Nakamuraginme]

St-25: NSMT-P 58615 (1), 11.6 cm SL. 40°02.6'N, 600-626 m depths.

Order Zeiformes

Family Zeidae

*Zenopsis nebulosa* (Temminck and Schlegel, 1845) [Japanese name: Kagamidai]

St-98: NSMT-P 58538 (1), 7.0 cm SL. 39°02.2'N, 450-478 m depths.

Order Scorpaeniformes

Family Scorpaenidae

*Ectreposebastes imus* Garman, 1899 [Japanese name: Kurokasago]

St-102: NSMT-P 58537 (2), 8.5-8.8 cm SL. 39°0.02'N, 650-679 m depths.

Family Psychrolutidae

*Psychrolutes phrictus* Stein and Bond, 1978 [Japanese name: Nyuudoukajika]

St-32: NSMT-P 58618 (1), 2.6 cm SL; St-89: NSMT-P 58917 (1), 3.4 cm SL. 39°59.5'N-40°40.2'N, 220-577 m depths.

Family Cyclopteridae

*Aptocyclus ventricosus* (Pallas, 1769) [Japanese name: Hoteiuo]

St-11: NSMT-P 58926 (1), 8.5 cm SL; St-18: NSMT-P 58886 (1), 7.0 cm SL; St-45: NSMT-P

58925 (1), 2.6 cm SL; St-101: NSMT-P 58924 (1), 3.0 cm SL. 41°00.5'N-41°16.7'N, 60-656 m depths.

*Remarks.* The mesopelagic occurrence of this species was reported from the Sea of Japan off southern Hokkaido, Japan (Shinohara *et al.*, 1992).

#### Family Liparidae

*Nectoliparis pelagicus* Gilbert and Burke, 1912 [Japanese name: Kantenuo]

St-45: NSMT-P 58974 (1), 4.1 cm SL. 40°01.2'N, 60-89 m depths.

#### Order Perciformes

#### Family Acropomatidae

*Howella parini* Fedoryako, 1976 [Japanese name: Kushisumikuiuo]

St-18: NSMT-P 59264 (6), 9.0-10.0 cm SL; St-34: NSMT-P 59265 (1), 4.2 cm SL; St-35: NSMT-P 58923 (2), 9.4-9.9 cm SL; St-60: NSMT-P 59263 (1), 9.5 cm SL; St-102: NSMT-P 58921 (2), 9.0-9.4 cm SL; St-104: NSMT-P 59266 (4), 8.6-10.3 cm SL; St-107: NSMT-P 58922 (1), 8.8 cm SL. 39°00.2'N-41°16.7'N, 420-679 m depths.

*Remarks.* *Howella parini* was originally described by Fedoryako (1976) on the basis of two specimens from the Emperor Sea Mounts (31°-37°N, 172°-176°E). Some additional specimens were reported from the Pacific Ocean off Hokkaido, Japan (Amaoka *et al.*, 1978; Parin *et al.*, 1995). The present specimens had somewhat fewer numbers of scales in the lateral line (46-51 vs. 49-53 in previous papers; Fedoryako, 1976; Amaoka *et al.*, 1978; Parin *et al.*, 1995; Hatooka, 2002). Although *H. parini* was reported as lacking teeth on the vomer and palatines (e.g., Fedoryako, 1976; Hatooka, 2002), the present specimens have these teeth. It is assumed that previous studies did not find these teeth because of difficulties when mouths of preserved specimens are closed. Presence of these teeth may be a general character for genus *Howella*. The gonad of one female occupied 2/3 of the abdominal cavity and was filled by immature eggs 0.3-0.5 mm in diameter. The stomach contained planktonic organisms such as copepods, amphipods and ephausiids (*Thysanoessa* spp.).

*Howella zina* Fedoryako, 1976 [Japanese name: Toge-kushisumikuiuo]

St-60: NSMT-P 59267 (2), 4.6-7.8 cm SL. 41°01.1'N, 650-677 m depths.

*Remarks.* *Howella zina* was originally described by Fedoryako (1976) on the basis of two specimens collected from the south-western Pacific (29°20'N, 142°41'E). Yamakawa (1982) reported 3 additional specimens from the Kyushu-Palau Ridge, Japan. The present specimens represent the third record for the species, giving a northward range extension to 41°01'N. According to Fedoryako (1976), this species is unique in the genus *Howella* by having additional rows of cteni on the exposed upper surface of scales.

#### Family Epigonidae

*Brephostoma carpenteri* Alcock, 1889 [New Japanese name: Urokoyasemutsu] (Fig. 3D)

St-98: MIMB 3258 (1), 8.7 cm SL; St-101: NSMT-P 59269 (1), 8.4 cm SL; St-103: NSMT-P 59270 (1), 5.6 cm SL. 38°57.9'N-39°02.2'N, 450-627 m depths.

*Description.* Dorsal fin VI-I, 10; anal fin I, 9; pectoral fin 15-16; pelvic fin I, 5; caudal fin 8-11 (dorsal procurrent rays) + 9 (dorsal principal rays) + 8 (ventral principal rays) + 8-11 (lower procurrent rays), lateral line scales 39-40; scales in transverse row from origin of first dorsal fin 14; gill

rakers 6-7 + 1 + 12-13 = 18-20, pseudobranch filaments 13-18; vertebrae 10 + 15-16 = 25-26. Preanal length 59.4-64.3% SL, predorsal length 38.5-38.8, preventral length 36.2-36.3, prepectoral length 29.4-32.8, first dorsal fin base 9.8-10.6, second dorsal fin base 11.0-11.8, distance between origins of first and second dorsal fins 19.3-19.4, anal fin base 10.3-10.8, distance between anus and insertion of ventral fins 21.1-21.2, distance between anus and origin of anal fin 5.9-7.5, pectoral fin 25.3-26.3, body width 15.0-15.1, greatest depth of body 23.5-25.9, caudal peduncle depth 11.1-11.3, HL 29.4-29.8. Snout 8.6-8.8% HL, eye diameter 9.9-10.6, interorbital width 6.2-6.5, upper jaw length 11.0-11.4, longest gill raker 4.6-5.9. Body slightly elongate, head rather long and compressed. Pectoral fin small, reaching only to vertical through anal fin origin. Caducous ctenoid scales covered all body and head. Scales on body slightly convex and bearing small circular ridges, which on their posterior edges (not hidden by scale pockets) covered with spinules. In transverse row from first spine of the first dorsal fin 14 rows of scales. Channel of lateral line complete, uninterrupted, consisting of 39-40 perforated scales, running in 4th row of scales below first dorsal fin, beginning from posterior edge of operculum and terminating on the caudal fin rays. Last 4-5 lateral line scales extended onto the caudal fin, occupying 80% of its central rays. Except first dorsal, fins covered by skin: second dorsal fin and anal fin both to 100% of their length, pectoral fin to 20%. Thin, small and slightly curved teeth in one row on jaws and anterior half of palatine. Teeth in 2 rows in anterior part of lower jaw. Vomerine teeth 10-12, in two rows. Upper and lower surface of gill rakers covered by small spinules. Gill rakers rather long, 1.5-1.9 times longer than their filaments. Pseudobranch well developed. A weak spine on opercle. One specimen (MIMB 3258) with 2 very weak additional spinules on the posterior edge of opercle and one on posterior edge of subopercle. Many neuromasts or free pit organs on undamaged dorsal surface of snout around nostrils.

*Remarks.* *Brephostoma carpenteri* was originally described by Alcock (1889) on the basis of a single specimen collected from the Bay of Bengal. Mead and De Falla (1965) reported additional specimens from the Indian Ocean. Fedoryako (1976) and Parin *et al.* (1977) recorded this species from near Iwo Island (Iwo Jima), Japan. But Hatooka (2002) didn't list *B. carpenteri* among Japanese fishes because of uncertain familial rank and the lack of specimens available to examine. According to Fedoryako (1976), *B. carpenteri* has one spine in the anal fin and lateral line scales extending to caudal fin. Measurements, counts, structure of body scales and lateral line channel of present specimens agree well with Fedoryako's (1976) description. New Japanese name, Urokoyasemutsu-zoku, is given to *Brephostoma*.

#### Family Caristiidae

*Caristius macropus* (Bellotti, 1903) [Japanese name: Yaegisu]

St-79: NSMT-P 59244 (1), 29.5 cm SL; St-85: NSMT-P 59271 (1), 28.2 cm SL; St-96: NSMT-P 59272 (1), 15.2 cm SL; St-102: NSMT-P 58725 (1), 11.7 cm SL; St-107: NSMT-P 59273(1), 18.0 cm SL; St-108: NSMT-P 59274 (1), 15.2 cm SL. 39°00.2'N-41°17.8'N, 210-679 m depths.

*Caristius* sp. [Japanese name: Kokuchiyaegisu]

St-102: NSMT-P 59275 (1), 13.2 cm SL; St-103: NSMT-P 59276 (1), 20.6 cm SL. 38°58.4'N-39°00.2'N, 600-679 m depths.

*Remarks.* Identification follows Fujii (1984) who reported specimens from near the Ogasawara Islands, Japan.

#### Family Zoarcidae

***Bothrocarina microcephala*** (Schmidt, 1938) [Japanese name: Kamuchakkagenge]

St-76: NSMT-P 58952 (1), 27.5 cm SL. 41°17.8'N, 550-577 m depths.

## Family Chiasmodontidae

***Chiasmodon lavenbergi*** Prokofiev, 2008 [New Japanese name: Zarabouzugisu]

St-22: NSMT-P 59548 (1), 16 cm SL; St-38: NSMT-P 59277 (1), 17.2 cm SL; St-47: NSMT-P 59547 (1), 13.1 cm SL; St-62: NSMT-P 59545 (1), 15 cm SL; St-99: NSMT-P 59550 (1), 16.7 cm SL; St-100: NSMT-P 59532 (1), 6.6 cm SL; St-101: NSMT-P 59549 (3), 15.2-17.3 cm SL; St-102: NSMT-P 59670 (3), 8.5-13.8 cm SL; St-107: NSMT-P 59546 (1), 15 cm SL. 38°57.9'N-41°01.5'N, 450-679 m depths.

*Remarks.* The present specimens are paratypes of this species (see Prokofiev, 2008). *Chiasmodon lavenbergi* is distributed from the Kuril Islands to the Coral Sea including the Pacific coast of Japan.

***Pseudoscopelus sagamianus*** Tanaka, 1908 [Japanese name: Kurobouzugisu]

St-25: NSMT-P 59279 (1), 10.2 cm SL; St-102: NSMT-P 59281 (2), 7.8-8.4 cm SL. 39°00.2'N-40°02.6'N, 600-679 m depths.

## Family Gempylidae

***Nealotus tripes*** Johnson, 1865 [Japanese name: Fuuraikamasu]

St-80: NSMT-P 58712 (1), 13.5 cm SL; St-94: NSMT-P 58709 (2), 12.2-12.4 cm SL; St-95: NSMT-P 58710 (2), 11.7-12.4 cm SL; St-96: NSMT-P 58708 (1), 11.8 cm SL; St-100: NSMT-P 58705 (1), 12.0 cm SL; St-101: NSMT-P 58707 (1), 11.2 cm SL; St-102: NSMT-P 58704 (1), 12.5 cm SL; St-103: NSMT-P 58706 (1), 13.0 cm SL; St-104: NSMT-P 58711 (1), 13.2 cm SL. 38°57.9'N-41°11.9'N, 25-679 m depths.

## Family Trichiuridae

***Benthodesmus tenius*** (Günther, 1877) [Japanese name: Tachimodoki]

St-15: NSMT-P 58715 (1), 47.7 cm SL; St-93: NSMT-P 58717 (1), 15.5 cm SL; St-96: NSMT-P 58724 (2), 15.9-36.5 cm SL; St-103: NSMT-P 58716 (1), 16.2 cm SL; St-104: NSMT-P 58714 (1), 21.9 cm SL; St-107: NSMT-P 58718 (6), 15.1-19.0 cm SL; St-108: NSMT-P 58713 (5), 14.5-21.1 cm SL. 38°58.4'N-41°03.3'N, 160-677 m depths.

## Family Centrolophidae

***Icichthys lockingtoni*** Jordan and Gilbert, 1880 [Japanese name: Kuromedai]

St-17: NSMT-P 58855 (2), 29.5-35.0 cm SL; St-31: NSMT-P 59060 (1), 34.8 cm SL; St-100: NSMT-P 58726 (1), 16.1 cm SL. 40°00.3'N-41°19.6'N, 25-578 m depths.

## Family Nomeidae

***Psenes pellucidus*** Lütken, 1880 [Japanese name: Hanabirauo]

St-1: NSMT-P 58856 (1), 24.5 cm SL; St-102: NSMT-P 58737 (2), 18.9-22.2 cm SL. 39°0.01'N-40°58.9'N, 530-679 m depths.

## Family Tetragonuridae

*Tetragonurus cuvieri* Risso, 1810 [Japanese name: Dokuurokoibodai]

St-30: NSMT-P 59023 (2), 30.5–35.5 cm SL; St-31: NSMT-P 59058 (1), 32.7 cm SL; St-32: NSMT-P 59059 (2), 30.5–31.2 cm SL; St-34: NSMT-P 59057 (1), 28.6 cm SL. 39°59.5'N–40°00.3'N, 25–447 m depths.

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