

Fishes of the Boso Peninsula, Central Japan—III

Coastal and Deep-Sea Fishes Taken off Choshi

Masaki Miya,¹⁾ Hiroki Toho^{2),3)} and Kenji Mochizuki¹⁾

¹⁾ Natural History Museum and Institute, Chiba
955-2 Aoba-cho, Chuo-ku, Chiba 260, Japan

²⁾ Department of Oceanography, Tokai University
3-20-1 Orido, Shimizu, Shizuoka 424, Japan

³⁾ Present address: 2-4-6 Chuo-minato, Chuo-ku, Chiba 260, Japan

Abstract Faunal surveys were made on coastal and deep-sea fishes that were collected or recorded from catches (mostly those taken by bottom trawls) landed at the Choshi Fishery Market (Chiba Prefecture), central Japan, and supplemented by a few shore fishes taken from adjacent areas. A total of 258 species (including one unidentified lophiid species), representing 118 families, were recognized. Of the 257 identified species, 18 species (7.0%) and 134 species (52.1%) have their distribution centers located in northern and southern Japan (north and south of the peninsula), respectively, whereas the remaining 104 species (40.9%) are relatively wide-ranging, extending the length of Japan. The predominance of the southern species, along with occurrences of the northern species, albeit a few, are the zoogeographic characteristics of the region, reflecting presence of the cold, less saline Oyashio waters below the warm Kuroshio current flowing northward along the Boso Peninsula.

Key words: ichthyofauna, Choshi, Kuroshio, Oyashio, Boso Peninsula.

Choshi is located at the base of the Pacific Ocean side of the Boso Peninsula, central Japan, on the northeastern side of which the Tone River mouth is situated (Fig. 1). The offshore area of Choshi is well-known for its commercial fishing grounds, where cold but nutrient-rich waters originating from the Oyashio current intrude below the warm Kuroshio current. Various fisheries, including shallow and deep-sea bottom trawls, purse seines, and longlines currently operate.

Like other areas of the peninsula, except Aino-hama (Tateyama) and Chitose (Chikura), southernmost part (Miya *et al.*, 1994a, b), knowledge of the ichthyofaunal composition of the Choshi region has been limited to a now dated paper that included doubtful identifications without voucher specimens (Tamura *et al.*, 1962), and those reporting specific taxa such as sharks and rays (Taniuchi, 1984), or making scattered observations on taxonomy or biology (*e.g.*, Chen *et al.*, 1979, 1981; Taniuchi *et al.*, 1983; Suda *et al.*, 1986; Yamakawa *et al.*, 1986; Baba *et al.*, 1987; Taniuchi, 1988).

This paper, the third in a series, "Fishes of the Boso Peninsula," provides a list of fishes that were collected or recorded from catches landed at the Choshi Fishery Market, Chiba Prefecture, since 1985, and supplemented by a few shore fishes from adjacent areas, and briefly discusses zoogeographic characteristics of the area.

Materials and Methods

Fishes were collected from catches (mostly those of bottom trawls from about 30 to 1000 m depths) landed at the Choshi Fishery Market, or were taken from adjacent areas by bait fishing. Well-known or commercially important species that were unlikely to be misidentified were recorded, but not collected. Fishes that were too large to collect were recorded and photographed. Since the primary purpose of the survey was to assess qualitatively the ichthyofauna, no quantitative records were kept. Species identifications were based primarily on keys given in Nakabo (1993), and supplemented by reviews of specific taxa.

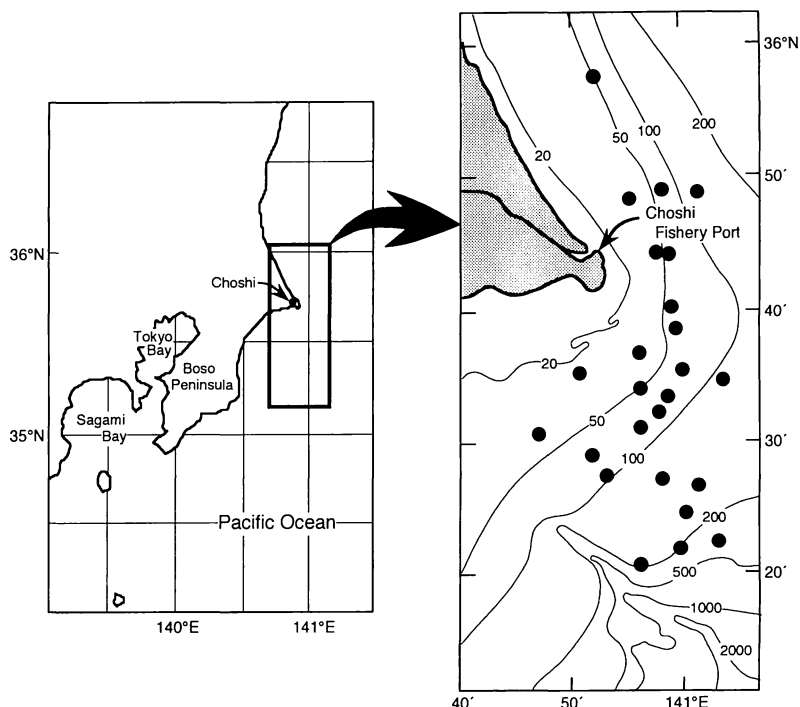


Fig. 1. Locations of Choshi and Choshi Fishery Market; localities where latitude, longitude and depths in meters were available from fishermen (●). Depth contour in meters.

All fishes collected were deposited at the Natural History Museum and Institute, Chiba (CBM). In the list of fishes below, species names, which follow Nakabo (1993), are followed by their Japanese names and distribution patterns in Japanese waters, designated by N, S, and W in parentheses. N and S denote those species whose distribution centers are located in northern and southern Japan (north and south of the peninsula), respectively. W denotes species occurring the length of Japan. Information on distribution patterns was taken from Nakabo (1993). The fishes are listed by family in phylogenetic sequence (Nakabo, 1993) and alphabetically within families by genus and species. A museum number (CBM-ZF) is given for each lot, followed by the number of specimens, size range in parentheses (preurogenital length [PUL] in ratfishes, total length [TL] in hagfishes, sharks and some bony fishes, disk width [DW] in rays, and standard length [SL] in other bony fishes; all in millimeters) and date of collection. When precise locality data were available from fishermen, latitude, longitude and depths in meters were given after

the date of collection. Fishes recorded, but not collected, are designated by asterisks before the species' name. Since the present survey was aimed at listing as many species as possible, any paucity of collection data does not necessarily infer an uncommon species.

List of Fishes

Class Myxini Order Myxiniformes Family Myxinidae

1. *Eptatretus burgeri* (Girard): nuta-unagi (S)
CBM-ZF 1773 (1, 445 mm TL), Dec. 21, 1990,
35°30.5' N, 141°10.3' E, 160 m
2. *Paramyxine fernholmi* Kuo, Huang et Mok
(W)
CBM-ZF 788 (1, 472 mm TL), Dec. 8, 1987
Remarks. Kuo *et al.* (1994) recently found
that there are three types in specimens formerly
referable to *Paramyxine atami* Dean. The present
specimen agrees well with the description of a
newly-described species, *P. fernholmi* Kuo,
Huang et Mok, in that it has

6 gill pouches and 3/2 fused unicuspid teeth.

Class Chondrichthyes
Order Chimaeriformes
Suborder Holocephali
Family Chimaeridae

3. *Chimaera phantasma* Jordan et Snyder: ginzame (W)
CBM-ZF 882 (1, 87 mm PUL), Jan. 27, 1988
4. *Hydrolagus barbouri* (Garman): kokonohoshiginzame (N)
CBM-ZF 874, 875 (2, 93, 270 mm PUL), Jan. 27, 1988

Suborder Elasmobranchii
Order Lamniformes
Family Lamnidae

5. **Isurus oxyrinchus* Rafinesque: aozame (S)
1 ♀ 2♂, 1300–1600 mm TL, Jan. 21, 1994
6. **Lamna ditropis* Hubbs et Follett: nezumizame (W)
2 ♀, 1900, 2400 mm TL, Jan. 26, 1994

Family Alopiidae

7. **Alopias vulpinus* (Bonnaterre): ma-onaga (S)
1♂, >2000 mm TL, Jan. 26, 1994

Order Carcharhiniformes
Family Scyliorhinidae

8. *Cephaloscyllium isbaellum* (Bonnaterre): nanukazame (W)
CBM-ZF 677 (1, 1340 mm TL), Dec. 8, 1986
9. *Galeus nipponensis* Nakaya: nihon-yamorzame (S)
CBM-ZF 4308 (1 ♀, 264 mm TL), Feb. 9, 1994
10. *Scyliorhinus torazame* (Tanaka): torazame (W)
CBM-ZF 1602 (1♂, 391), Apr. 4, 1991; 1790 (1 ♀, 220, 1♂, 325), Dec. 22, 1990, 35° 29.3' N, 141° 10.0' E, 181 m; 2109 (2♂, 323, 325), June 18, 1991, 35° 44.5' N, 140° 58.5' E, 60 m; 2272 (1♂, 240), Oct. 23, 1991; 2277 (1♂, 307), Oct. 30, 1991

Family Triakidae

11. *Mustelus manazo* Bleeker: hoshizame (W)
CBM-ZF 680 (1 ♀, 720 mm TL), Dec. 8, 1986; 2079 (1 ♀, 298), June 14, 1991
12. *Triakis scyllium* Müller et Henle: dochizame (W)
CBM-ZF 2330 (1♂, 612 mm TL), Dec. 25, 1991

Family Carcharhinidae

13. *Carcharhinus falciformis* (Bibron): kuro-

togarizame (S)

CBM-ZF 678 (1, 780 mm TL), Dec. 8, 1986

14. **Carcharhinus plumbeus* (Nardo): mejirozame (S)
2♂, 2600, 2700 mm TL, Jan. 21, 1994
15. **Galeocerdo cuvier* (Peron et Le Sueur): itachizame (S)
1♂, 1250 mm TL, Feb. 21, 1994
16. **Prionace glauca* (Linnaeus): yoshikirizame (S)
1♂, 1400 mm TL, 2 ♀, 1500, 2000, Jan. 21, 1994

Family Sphyrnidae

17. **Sphyrna zygaena* (Linnaeus): shiro-shumokuzame (W)
1 ♀, 940 mm TL, Mar. 15, 1994

Order Hexanchiformes
Family Hexanchidae

18. *Heptranchias perlo* (Bonnaterre): edo-aburazame (S)
CBM-ZF 2331 (1 ♀, 712 mm TL), Dec. 25, 1991

Order Dalatiiformes
Family Etmopteridae

19. *Centroscyllium ritteri* Jordan et Fowler: kasumizame (N)
CBM-ZF 547 (1 ♀, 337 mm TL), Dec. 11, 1986
20. *Etmopterus lucifer* Jordan et Snyder: fujikujira (W)
CBM-ZF 1617 (1, 105 mm TL), Apr. 4, 1991; 1724 (3, 125–275), Dec. 14, 1990, 35° 21.8' N, 140° 58.4' E, 200 m
21. *Etmopterus pusillus* (Lowe): karasuzame (W)
CBM-ZF 2325 (1, 290 mm TL), Dec. 25, 1991
22. *Etmopterus unicolor* (Engelhardt): nise-karasuzame (W)
CBM-ZF 1761 (1, 139 mm TL), Dec. 17, 1990, 35° 40.8' N, 140° 58.4' E, 63 m

Order Centrophoriformes
Family Centrophoridae

23. **Centrophorus atromarginatus* Garman: aizame (S)
12500 mm TL, Mar. 14, 1994.

Order Squaliformes
Family Squalidae

24. *Squalus japonicus* Ishikawa: togari-tsunozame (S)
CBM-ZF 871 (1, 593 mm TL), Jan. 27, 1988
25. *Squalus mitsukurii* Jordan et Fowler: futotsunozame (W)

CBM-ZF 681 (1, 790 mm TL), Dec. 8, 1986;
1791 (2♂, 225, 280), Dec. 19, 1990, 35°28.4'
N, 141°11.4' E, 250 m.

Order Squatiniformes

Family Squatinidae

26. *Squatina japonica* Bleeker: kasuzame (W)
CBM-ZF 1580 (1♀, 250 mm TL), Apr. 4,
1991; 2047 (1♀, 197), June 11, 1991

Order Pristiophoriformes

Family Pristiophoridae

27. *Pristiophorus japonicus* Günther: nokogiri-
zame (W)
CBM-ZF 679 (1, 870 mm TL), Dec. 8, 1986

Order Rajiformes

Family Rhinobatidae

28. *Rhinobatos schlegelii* Müller et Henle: sakata-
zame (S)
CBM-ZF 1104 (1, 668 mm TL), Jan. 13, 1986

Family Rajidae

29. *Raja pulchra* Liu: meganekasube (S)
CBM-ZF 1591 (2♂, 142, 238 mm DW), Apr. 4,
1991; 1824 (1♀, 236), May 8, 1991, 35°44.6'
N, 140°58.2' E, 60 m; 2113 (1♂, 190), June
22, 1991
30. *Raja schmidtii* Ishiyama: tsumarikasube (S)
CBM-ZF 753 (1♀, 208 mm DW), Dec. 14,
1987

Family Dasyatidae

31. *Dasyatis akajei* (Müller et Henle): aka-ei (S)
CBM-ZF 2298 (1♂, 363 mm DW), Nov. 20,
1991

Family Myliobatidae

32. *Manta birostris* (Donndorff): oni-itomaki-ei
(S)
CBM-ZF 673 (1♂, 470 mm DW), Oct. 30,
1986
33. *Myliobatis tobijei* Bleeker: tobi-ei (S)
CBM-ZF 1592 (1♂, 383 mm DW), Apr. 4,
1991

Class Osteichthyes

Order Elopiformes

Family Pterothrissidae

34. *Pterothrissus gissu* Hilgendorf: gisu (W)
CBM-ZF 1598 (1, 206 mm SL), Apr. 4, 1991

Order Anguilliformes

Family Synbranchidae

35. *Simenchelys parasiticus* Gill: kongō-anago

(W)

CBM-ZF 851, 852 (2, 436, 388 mm SL), Jan.
27, 1988

Family Congridae

36. *Anago anago* (Temminck et Schlegel): goten-
anago (S)
CBM-ZF 1615 (2, 466, 479 mm SL), Apr. 4,
1991; 1709 (2, 270, 332), Dec. 14, 1990,
35°28.6' N, 140°59.5' E, 120 m
37. *Conger myriaster* (Brevoort): ma-anago (S)
CBM-ZF 1723 (2, 325, 355 mm SL), Dec. 14,
1990
38. *Gnathophis nystromi nystromi* (Jordan et
Snyder): gin-anago (W)
CBM-ZF 1611 (2, 320, 347 mm SL), Apr. 4,
1991; 1744 (1, 266), Dec. 14, 1990, 35°28.6' N,
140°59.5' E, 120 m; 1819 (2, 300, 315), May 8,
1991, 35°44.6' N, 140°58.2' E, 60 m; 2067 (1,
314), June 11, 1991; 2076 (1, 325), June 12,
1991; 2093 (1, 252), June 18, 1991, 35°44.5'
N, 140°58.5' E, 60 m

Order Notacanthiformes

Family Notacanthidae

39. *Notacanthus abbotti* Fowler: kitsune-soko-
gisu (S)
CBM-ZF 2323 (1, 275 mm SL), Dec. 25, 1991
40. *Notacanthus chemnitzii* Bloch: kuro-sokogisu
(S)
CBM-ZF 798, 857 (2, 372, 635 mm SL), Jan.
27, 1988

Order Clupeiformes

Family Clupeidae

41. *Etrumeus teres* (De Key): urume-iwashi (W)
CBM-ZF 1645 (5, 100–128 mm SL), Apr. 24,
1991, 35°39.6' N, 140°59.0' E, 65 m; 2270 (2,
155, 164), Oct. 21, 1991, 35°45.5' N,
140°58.2' E, 60 m
42. *Konosirus punctatus* (Temminck et Schlegel):
konoshiro (W)
CBM-ZF 2338 (1, 161 mm SL), Feb. 27, 1992
43. *Sardinops melanostictus* (Temminck et Schle-
gel): ma-iwashi (W)
CBM-ZF 2273 (1, 195 mm SL), Oct. 23, 1991

Family Engraulidae

44. *Engraulis japonicus* (Houttuyn): katakuchi-
iwashi (W)
CBM-ZF 1644 (7, 96–130 mm SL), Apr. 24,
1991, 35°39.6' N, 140°59.0' E, 65 m; 2085
(3, 123–128), June 18, 1991, 35°44.5' N,
140°58.5' E, 60 m

Order Gonorynchiformes

Family Gonorynchidae

45. *Gonorynchus abbreviatus* Temminck et Schlegel: nezumigisu (S)
CBM-ZF 853 (1, 187 mm SL), Jan. 27, 1988

Order Salmoniformes

Family Argentinidae

46. *Argentina kagoshimae* Jordan et Snyder: kagoshima-nigisu (S)
CBM-ZF 1745 (1, 147 mm SL), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m
47. *Glossanodon lineatus* (Matsubara): ichimonji-iwashi (S)
CBM-ZF 1627 (185 mm SL), Apr. 4, 1991
48. *Glossanodon semifasciatus* (Kishinouye): nigisu (S)
CBM-ZF 1649 (2, 65, 142 mm SL), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1823 (2, 64, 75), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2107 (5, 119–128), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m; 2274 (1, 185), Oct. 23, 1991

Family Salmonidae

49. *Oncorhynchus keta* (Walbaum): sake (N)
CBM-ZF 2335 (1, 540 mm SL), Nov. 27, 1991

Order Stomiiformes

Family Sternoptychidae

50. *Maurolicus muelleri* (Gmelin): kyûri-eso (W)
CBM-ZF 5713 (2, 35, 41 mm SL), Feb. 4, 1994
51. *Polyipnus matsubarai* Schultz: hoshi-hônen-eso (W)
CBM-ZF 1754 (2, 71, 77 mm SL), Dec. 17, 1990, 35°21.6' N, 141°01.5' E, 260 m

Order Aulopiformes

Family Aulopodidae

52. *Aulopus japonicus* Günther: hime (S)
CBM-ZF 1619 (1, 96 mm SL), Apr. 4, 1991; 1636 (3, 95–112), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1798 (5, 85–99), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m

Family Chlorophthalmidae

53. *Chlorophthalmus borealis* Kuronuma et Yamaguchi: maru-aome-eso (N)
CBM-ZF 767–9 (3, 128–141 mm SL), Dec. 14, 1987; 1607 (1, 122), Apr. 4, 1991; 1729 (3, 97–125), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m; 2063 (1, 126), June 11, 1991

Family Synodontidae

54. *Saurida elongata* (Temminck et Schlegel): tokage-eso (S)
CBM-ZF 5492 (1, 390 mm SL), Apr. 10, 1994
55. *Saurida* sp. 2: ma-eso (S)
CBM-ZF 2322 (1, 212 mm SL), Dec. 25, 1991
Remarks. This species was formerly referred to as *Saurida undosquamis* (Richardson) (e.g., Masuda *et al.*, 1984), although the latter was described from a north-eastern Australian specimen. Yamada (1994) found two types to be represented, tentatively assigning one of them, the more common and broadly distributed form to *Saurida* sp. 2.
56. *Trachinocephalus myops* (Schneider): oki-eso (S)
CBM-ZF 1612 (1, 125 mm SL), Apr. 4, 1991

Order Myctophiformes

Family Neoscopelidae

57. *Neoscopelus macrolepidotus* Johnson: sotoori-iwashi (W)
CBM-ZF 5712 (1, 247 mm SL), Mar. 25, 1991

Family Myctophidae

58. *Diaphus gigas* Gilbert: suitôhadaka (S)
CBM-ZF 2275 (2, 89, 93 mm SL), Oct. 23, 1991
58. *Diaphus watasei* Jordan et Starks: hadaka-iwashi (S)
CBM-ZF 1610 (2, 90, 138 mm SL), Apr. 4, 1991
60. *Lampanyctus jordani* Gilbert: mame-hadaka (N)
CBM-ZF 1732, 1762 (5, 112–119 mm SL), Dec. 14, 17, 1990, 35°21.6' N, 141°01.5' E, 260 m

Order Gadiformes

Family Moridae

61. *Antimora microlepis* Bean: kanada-dara (N)
CBM-ZF 862, 864 (2, 210, 217 mm SL), Jan. 27, 1988
62. *Laemonema longipes* Schmidt: itohiki-dara (N)
CBM-ZF 846, 847 (2, 317, 409 mm SL), Jan. 27, 1988
63. *Physiculus japonicus* Hilgendorf: chigodara (S)
CBM-ZF 1613 (1, 124 mm SL), Apr. 4, 1991; 1734 (1, 124), Dec. 14, 1990, 35°21.6' N, 141°01.5' E, 260 m; 1818 (2, 133, 169), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2061 (1, 148), June 11, 1991; 2097 (4, 70–160), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m

Family Gadidae

64. **Theragra chalcogramma* (Pallas): suketôdara (N)
June 18, 1991

Family Macrouridae

65. *Caelorinchus gilberti* Jordan et Hubbs: oni-hige (W)
CBM-ZF 1747 (1, 305 mm TL), Dec. 14, 1990, 35°21.6' N, 141°01.5' E, 260 m; 1766 (1, 230), Dec. 17, 1990, 35°21.6' N, 141°01.5' E, 260 m
66. *Caelorinchus hubbsi* Matsubara: moyô-hige (S)
CBM-ZF 2069 (1, 211 mm TL), June 11, 1991; 2464 (1, 165), Feb. 27, 1992
67. *Caelorinchus longissimus* Matsubara: tongari-hige (S)
CBM-ZF 5501 (1, 164+ mm TL), June 21, 1994
68. *Ventrifossa fusca* Okamura: karasu-hige (S)
CBM-ZF 2459 (1, 254 mm TL), Feb. 27, 1992
69. *Ventrifossa garmani* (Jordan et Gilbert): sagami-sokodara (S)
CBM-ZF 2065 (1, 168 mm TL), June 11, 1991
70. *Ventrifossa japonica* (Matsubara): kagami-hige (S)
CBM-ZF 1749 (2, 144, 154 mm TL), Dec. 14, 1990, 35°21.6' N, 141°01.5' E, 260 m
71. *Ventrifossa longibarbata* Okamura: okina-hige (S)
CBM-ZF 2460 (1, 225+ mm TL), Feb. 27, 1992
72. *Ventrifossa misakia* (Jordan et Gilbert): misaki-sokodara (S)
CBM-ZF 1748 (1, 210 mm TL), Dec. 14, 1990, 35°21.6' N, 141°01.5' E, 260 m

Order Ophidiiformes

Family Ophidiidae

73. *Hoplobrotula armata* (Temminck et Schlegel): yoroi-itachiuo (S)
CBM-ZF 810 (1, 234 mm SL), Jan. 27, 1988
74. *Neobythites sivicolus* (Jordan et Snyder): shio-itachiuo (S)
CBM-ZF 1733 (2, 126, 135 mm SL), Dec. 14, 1990, 35°21.6' N, 141°01.5' E, 260 m; 2098 (5, 82–176), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m

Order Lophiiformes

Family Lophiidae

75. *Lophiodes* sp.
CBM-ZF 2462 (1, 155 mm SL), Feb. 27, 1992
Remarks. This specimen is apparently a member of the genus *Lophiodes* in that it has

a moderately depressed head and body, two spines on the articular, one anterior and one posterior to the jaw joint, and gill openings extending below, behind and in front of the pectoral fin bases (Caruso, 1981). However, it was distinguishable from all other known species by the combination of the following characters: spinous dorsal fin with five spines; third dorsal spine long (36.6% SL), but not reaching soft dorsal-fin ray; fifth dorsal spine short, not reaching soft dorsal-fin ray; esca leaf-like, with pigment becoming progressively darker toward tip; pectoral fin rays 20.

76. *Lophiomus setigerus* (Vahl): ankô (W)
CBM-ZF 2461 (1, 170 mm SL), Feb. 27, 1992
77. *Lophius litulon* (Jordan): ki-ankô (W)
CBM-ZF 1775 (1, 151 mm SL), Dec. 22, 1990, 35°20.6' N, 140°56.5' E, 190 m; 2261 (1, 173), Sept. 13, 1991; 2268 (3, 112–166), Oct. 21, 1991, 35°45.5' N, 140°58.2' E, 60 m

Family Antennariidae

78. *Antennarius striatus* (Shaw et Nodder): izari-uo (S)
CBM-ZF 1638 (1, 108 mm SL), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1774 (1, 112), Dec. 22, 1990, 35°29.3' N, 141°10.0' E, 180 m

Family Chaunacidae

79. *Chaunax abei* le Danois: midori-fusa-ankô (S)
CBM-ZF 1604 (1, 89 mm SL), Apr. 4, 1991; 1711 (1, 150), Dec. 14, 1990, 35°28.6' N, 140°59.5' E, 120 m; 1822 (1, 35), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2057 (1, 133), June 11, 1991; 2081 (5, 31–97), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m
80. *Chaunax fimbriatus* Hilgendorf: hon-fusa-ankô (S)
CBM-ZF 2300 (1, 240 mm SL), Nov. 27, 1991

Family Ogcocephalidae

81. *Halieutaea stellata* (Vahl): aka-gutsu (S)
CBM-ZF 1660 (1, 102 mm SL), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1806 (2, 86, 99), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2080 (4, 58–85), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m
82. *Malthopsis lutea* Alcock: fûryû-uo (S)
CBM-ZF 2299 (1, 84 mm SL), Nov. 27, 1991

Order Beloniformes

Family Scomberesocidae

83. *Cololabis saira* (Brevoort): sanma (W)
CBM-ZF 1703 (2, 285, 287 mm SL), Dec. 6, 1990, 35°35.1' N, 141°03.0' E, 110 m

Order Lampriformes

Family Lampridae

84. **Lampris guttatus* (Brünnich): aka-manbō (S)
Jan. 27, 1994

Order Beryciformes

Family Berycidae

85. *Beryx splendens* Lowe: kinmedai (W)
CBM-ZF 1695 (2, 177, 187 mm SL), Dec. 4, 1990, 35°27.5' N, 141°08.6' E, 200 m; 2074 (1, 149), June 12, 1991

Family Trachichthyidae

86. *Gephyroberyx japonicus* (Döderlein): hashikinme (W)
CBM-ZF 1710 (2, 187, 193 mm SL), Dec. 14, 1990, 35°21.6' N, 141°01.5' E, 260 m

Family Holocentridae

87. *Ostichthys japonicus* (Cuvier): ebisudai (S)
CBM-ZF 854, 855 (2, 215, 217 mm SL), Jan. 27, 1988

Family Polymixiidae

88. *Polymixia japonica* Günther: ginmedai (S)
CBM-ZF 1776 (3, 158–183 mm SL), Dec. 22, 1990, 35°29.3' N, 141°10.0' E, 180 m; 2339 (1, 105), Feb. 27, 1992

Order Cetomimiformes

Family Ateleopodidae

89. *Ateleopus japonicus* Bleeker: syachiburi (S)
CBM-ZF 2266 (1, 653 mm SL), Oct. 17, 1991, 35°44.5' N, 140°58.5' E, 60 m
90. *Ateleopus tanabensis* Tanaka: tanabe-syachiburi (S)
CBM-ZF 2070 (1, 215+ mm SL), June 11, 1991; 2084 (1, 370), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m; 2276 (3, 285–310), Oct. 23, 1991

Order Zeiformes

Family Zeidae

91. *Zenopsis nebulosa* (Temminck et Schlegel): kagamidai (S)
CBM-ZF 1801 (1, 63 mm SL), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2095 (2, 85, 95), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m; 2303 (1, 215), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m
92. *Zeus faber* Linnaeus: matōdai (S)
CBM-ZF 1589 (1, 159 mm SL), Apr. 4, 1991; 1606 (2, 110, 116), Apr. 4, 1991; 1800 (1, 79),

May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2252 (1, 59), Sept. 11, 1991; 2304 (1, 224), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m

Order Syngnathiformes

Family Macroramphosidae

93. *Macroramphosus scolopax* Linnaeus: sagifue (S)
CBM-ZF 1620 (14, 49–88 mm SL), Apr. 4, 1991; 1637 (2, 75, 82), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1794 (5, 65–82), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2055 (2, 92, 97), June 11, 1991; 2082 (5, 81–99), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m

Family Syngnathidae

94. *Trachyrhamphus serratus* (Temminck et Schlegel): hifukiyōji (S)
CBM-ZF 2112 (1, 240 mm SL), June 22, 1991, 35°55.6' N, 140°53.0' E, 60 m

Order Scorpaeniformes

Family Scorpaenidae

95. *Apistus carinatus* (Bloch et Schneider): hachi (S)
CBM-ZF 1582 (1, 68 mm SL), Apr. 4, 1991; 2099 (1, 75), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m
96. *Helicolenus hilgendorfi* (Steindachner et Döderlein): yumekasago (W)
CBM-ZF 1708 (1, 164 mm SL), Dec. 14, 1990, 35°21.8' N, 140°58.4' E, 200 m; 1782 (1, 137), Dec. 19, 1990, 35°35.5' N, 140°56.2' E, 50 m; 2054 (1, 111), June 11, 1991; 2327 (1, 220), Dec. 25, 1991
97. *Hozukius embremarius* (Jordan et Starks): hōzuki (W)
CBM-ZF 2328 (1, 193 mm SL), Dec. 25, 1991
98. *Neosebastes entaxis* Jordan et Starks: hirenagakasago (S)
CBM-ZF 1764 (1, 116 mm SL), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m; 2256 (1, 153), Sept. 13, 1991
99. *Pterois lunulata* Temminck et Schlegel: minokasago (W)
CBM-ZF 1751 (2, 176, 180 mm SL), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m
100. *Scorpaena izensis* Jordan et Starks: izukasago (S)
CBM-ZF 1674 (1, 92 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1778 (1, 170), Dec. 22, 1990, 35°20.6' N, 140°56.5' E, 190 m; 2088 (2, 56, 70), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m; 2250 (1, 174), Sept. 11, 1991; 2255 (1, 119), Sept. 13, 1991
101. **Sebastes joyneri* Günther: togotto-mearu

- (W)
June 21, 1993
102. **Sebastes matsubarae* Hilgendorf: akôdai (N)
June 21, 1993
103. *Sebastes scythropus* (Jordan et Starks): ukeguchi-mebaru (W)
CBM-ZF 1707 (2, 174, 189 mm SL), Dec. 14, 1990, 35°21.8' N, 140°58.4' E, 200 m; 1780 (1, 159), Dec. 22, 1990, 35°20.6' N, 140°56.5' E, 190 m; 2326 (1, 199), Dec. 25, 1991
104. *Sebastiscus marmoratus* (Cuvier): kasago (W)
CBM-ZF 1781 (1, 170 mm SL), Dec. 22, 1990, 35°20.6' N, 140°56.5' E, 190 m
105. *Sebastolobus macrochir* (Günther): kichiji (N)
CBM-ZF 2281 (1, 206 mm SL), Nov. 8, 1991
106. *Setarches guentheri* Johnson: shirokasago (S)
CBM-ZF 1694 (1, 195 mm SL), Dec. 4, 1990, 35°20.8' N, 141°09.5' E, 380 m
107. *Setarches longimanus* Alcock: akakasago (S)
CBM-ZF 2329 (1, 193 mm SL), Dec. 4, 1990, 35°20.8' N, 141°09.5' E, 380 m
- Family Tetrarogidae
108. *Hypodytes rubripinnis* (Temminck et Schlegel): ha-okoze (S)
CBM-ZF 1635 (1, 55 mm SL), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m
- Family Aploactinidae
109. *Erisphex pottii* (Steindachner): abu-okoze (W)
CBM-ZF 1614 (2, 38, 45 mm SL), Apr. 4, 1991; 1633 (3, 58–66), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1716 (5, 58–78), Dec. 14, 1991, 35°48.0' N, 140°57.4' E, 65 m; 1797 (1, 74), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m
- Family Triglidae
110. *Chelidonichthys spinosus* (McClelland): hôbô (W)
CBM-ZF 1588 (1, 134 mm SL), Apr. 4, 1991; 1702 (1, 215), Dec. 6, 1990, 35°32.6' N, 140°57.4' E, 90 m; 2318 (1, 164), Dec. 11, 1991
111. *Lepidotrigla abyssalis* Jordan et Starks: soko-kagashira (S)
CBM-ZF 1608 (1, 76 mm SL), Apr. 4, 1991; 1656 (6, 55–103), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1815 (3, 79–115), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 1721 (1, 85), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m
112. *Lepidotrigla guentheri* Hilgendorf: kanado (S)
CBM-ZF 1687, 1688 (2, 155, 140 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1720 (1, 69), Dec. 14, 1990; 1805 (1, 76), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2251 (2, 113, 129), Sept. 11, 1991
113. *Lepidotrigla kishinouyei* Snyder: oni-kagashira (S)
CBM-ZF 2332 (1, 128 mm SL), Sept. 11, 1991
114. *Pterygotrigla hemisticta* (Temminck et Schlegel): sokohôbô (S)
CBM-ZF 1584 (1, 78 mm SL), Apr. 4, 1991; 1719 (1, 51), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m; 2100 (1, 76), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m
- Family Peristediidae
115. *Gargariscus prionocephalus* (Duméril): oni-kihôbô (S)
CBM-ZF 1786 (1, 83 mm SL), Dec. 22, 1990, 35°20.6' N, 140°56.5' E, 190 m
116. *Peristedion orientale* Temminck et Schlegel: kihôbô (S)
CBM-ZF 1787 (1, 94 mm SL), Dec. 22, 1990, 35°20.6' N, 140°56.5' E, 190 m; 1808 (2, 88, 99), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2056 (1, 122), June 11, 1991; 2101 (3, 92–101), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m
117. *Satyrichthys amiscus* (Jordan et Starks): higekihôbô (S)
CBM-ZF 2457 (3, 100–144 mm SL), Feb. 27, 1992
- Family Platycephalidae
118. *Cociella crocodila* (Tilesius): inegochi (S)
CBM-ZF 2253 (1, 330 mm SL), Sept. 11, 1991; 2284 (1, 270), Nov. 8, 1991; 2310 (1, 305), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m
119. *Platycephalus* sp. 2: magochi (S)
CBM-ZF 2319 (1, 223 mm SL), Dec. 11, 1991
Remarks. This species was formerly referred to as *Platycephalus indicus* Linnaeus (e.g. Masuda *et al.*, 1984), although it includes two distinct forms, which have been characterized by an electrophoretic study (Tani-guchi *et al.*, 1972). *Platycephalus* sp. 2 was tentatively assigned to the form being more common on the Pacific Ocean side of Honshu Island, central Japan (Nakabo, 1993).
120. *Suggrundus meerdervoorti* (Bleeker): megochi (S)
CBM-ZF 2111 (2, 121, 172 mm SL), June 22, 1991, 35°55.6' N, 140°53.0' E, 60 m
- Family Dactylopteridae
121. *Dactyloptena orientalis* (Cuvier): semihôbô (S)
CBM-ZF 1696 (1, 178 mm SL), Dec. 4, 1990, 35°33.6' N, 140°58.4' E, 90 m; 1759 (1, 167), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m

122. *Daicocus peterseni* (Nyström): hoshisemi-hôbô (S)
CBM-ZF 1699 (1, 98 mm SL), Dec. 4, 1990, 35°33.6' N, 140°58.4' E, 90 m; 1715 (1, 118), Dec. 14, 1990, 35°34.5' N, 140°58.4' E, 80 m; 2078 (1, 308), June 12, 1991

Family Anoplopomatidae

123. **Erilepis zonifer* (Lockington): aburabôzu (N)
May 8, 1991

Family Hexagrammidae

124. *Hexagrammos agrammus* (Temminck et Schlegel): kujime (W)
CBM-ZF 2645 (3, 119–140 mm SL), Nov. 3, 1985, Togawa Fishery Port
125. *Hexagrammos otakii* Jordan et Starks: ainame (W)
CBM-ZF 1595 (1, 175 mm SL), Apr. 4, 1991; 2048 (1, 191), June 11, 1991

Family Hemitriptidae

126. *Hemitripterus villosus* (Pallas): kemushikajika (N)
CBM-ZF 1581 (1, 125 mm SL), Apr. 4, 1991

Family Cottidae

127. *Stlengis misakia* (Jordan et Starks): urokakajika (W)
CBM-ZF 4315 (1, 76 mm SL), Jan. 14, 1994

Family Psychrolutidae

128. *Dasycottus setiger* Bean: ganko (N)
CBM-ZF 5497 (1, 92 mm SL), May 25, 1994
129. *Ebinania brephocephala* (Jordan et Starks): bôzukajika (N)
CBM-ZF 2458 (1, 120 mm SL), Feb. 27, 1992

Family Liparidae

130. *Liparis tanakai* (Gilbert et Burke): kusa-uo (W)
CBM-ZF 2262 (1, 217 mm SL), Oct. 3, 1991, 35°44.5' N, 140°58.0' E, 50 m; 2267 (2, 238–243), Oct. 21, 1991, 35°45.5' N, 140°58.2' E, 50 m
131. *Liparis agassizi* Putnam: ezo-kusa-uo (N)
CBM-ZF 5495 (1, 137 mm SL), May 25, 1994

Order Perciformes

Family Percichthyidae

132. *Doederleinia berycoides* (Hilgendorf): akamutsu (W)
CBM-ZF 1616 (3, 79–91 mm SL), Apr. 4, 1991; 1783 (1, 156), Dec. 22, 1990, 35°20.6' N, 140°56.5' E, 190 m; 2096 (2, 75, 96), June 18,

1991, 35°44.5' N, 140°58.5' E, 60 m; 2292 (1, 275), Nov. 14, 1991

133. *Lateolabrax japonicus* (Cuvier): suzuki (W)
CBM-ZF 2334 (1, 475 mm SL), Nov. 27, 1991

134. *Nippon spinosus* Cuvier: ara (S)
CBM-ZF 1737 (1, 115 mm SL), Dec. 14, 1990, 35°34.5' N, 140°58.4' E, 80 m; 2094 (2, 71, 142), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m

135. *Stereolepis doederleini* Lindberg et Krasuykova: ôkuchi-ishinagi (W)
CBM-ZF 1673 (2, 161, 165 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1736 (1, 140), Dec. 14, 1990, 35°21.6' N, 141°01.5' E, 260 m; 2249 (1, 139), Sept. 11, 1991

136. *Synagrops japonicus* (Döderlein): sumikui-uo (W)
CBM-ZF 2068 (1, 153 mm SL), June 11, 1991; 2108 (4, 48–101), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m

Family Serranidae

137. *Epinephelus octofasciatus* (Griffin): mahatamodoki (S)
CBM-ZF 1587 (1, 121 mm SL), Apr. 4, 1991; 1632 (1, 83), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1810 (1, 127), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2317 (1, 150), Dec. 11, 1991
138. *Plectranthias kamii* Randall: izuhanadai (S)
CBM-ZF 1753 (1, 107 mm SL), Dec. 17, 1990

Family Terapontidae

139. *Terapon jarbua* (Forsskal): kotohiki (S)
CBM-ZF 2494 (6, 32–39 mm SL), Sept. 27, 1986; 2619 (1, 66), Nov. 3, 1985, Togawa Fishery Port

Family Priacanthidae

140. *Cookeolus japonicus* (Cuvier): chikame-kin-toki (S)
CBM-ZF 1586 (1, 121 mm SL), Apr. 4, 1991; 1683 (1, 165), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1758 (1, 134), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m
141. *Priacanthus macracanthus* Cuvier: kintokidai (S)
CBM-ZF 1597 (1, 151 mm SL), Apr. 15, 1991; 1647 (1, 153), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1675 (2, 144, 152), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1730 (1, 99), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m; 1765 (1, 142), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m
142. *Pristigenys nipponia* (Cuvier): kurumadai (S)
CBM-ZF 1788 (1, 51 mm SL), Dec. 19, 1990,

35°36.0' N, 140°59.8' E, 75 m

Family Apogonidae

143. *Apogon doederleini* Jordan et Snyder: ôsujishimochi (S)
CBM-ZF 1735 (3, 48–58 mm SL), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m; 1659 (1, 52), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m
144. *Apogon lineatus* Temminck et Schlegel: tenjikudai (W)
CBM-ZF 1718 (3, 61–64 mm SL), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m

Family Epigonidae

145. *Epigonus denticulatus* Dieuzeide: hage-yasemutsu (S)
CBM-ZF 2456 (3, 102–145 mm SL), Feb. 27, 1992

Family Sillaginidae

146. *Sillago japonica* Temminck et Schlegel: shiro-gisu (W)
CBM-ZF 1697 (1, 137 mm SL), Dec. 4, 1990, 35°32.2' N, 140°47.5' E, 40 m; 2481 (1, 140), June 29, 1986, Togawa Fishery Port

Family Branchiostegidae

147. *Branchiostegus auratus* (Kishinouye): ki-amadai (S)
CBM-ZF 2263 (1, 112 mm SL), Oct. 17, 1991, 35°45.5' N, 140°58.2' E, 60 m
148. *Branchiostegus japonicus* (Houttuyn): aka-amadai (S)
CBM-ZF 2279 (1, 141 mm SL), Oct. 30, 1991

Family Scombroproidae

149. *Scombrops boops* (Houttuyn): mutsu (W)
CBM-ZF 2295 (1, 166 mm SL), Nov. 20, 1991

Family Carangidae

150. *Caranx ignobilis* (Forsskål): rônin-aji (S)
CBM-ZF 2290 (1, 147 mm SL), Nov. 14, 1991
151. *Decapterus akaadsi* Abe: aka-aji (S)
CBM-ZF 1701 (1, 159 mm SL), Dec. 6, 1990, 35°48.0' N, 140°55.0' E, 50 m; 1771 (2, 165, 185), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m; 2280 (1, 166), Oct. 30, 1991; 4314 (1, 169), Jan. 26, 1994
152. *Decapterus macrosoma* Bleeker: moro (S)
CBM-ZF 1746 (1, 134 mm SL), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m; 1770 (2, 165, 177), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m
153. *Kaiwarinus equula* (Temminck et Schlegel): kaiwari (S)

CBM-ZF 1678 (2, 127, 147 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1777 (3, 129–139), Dec. 19, 1990, 35°36.0' N, 140°59.8' E, 75 m

154. *Selar crumenophthalmus* (Bloch): me-aji (S)
CBM-ZF 1677 (2, 160, 162 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m
155. **Seriola quinqueradiata* Temminck et Schlegel: buri (W)
May 24, 1994
156. *Seriolina nigrofasciata* (Rüppell): aiburi (S)
CBM-ZF 1769 (1, 160 mm SL), Dec. 17, 1990, 35°45.8' N, 140°58.4' E, 65 m
157. *Trachurus japonicus* (Temminck et Schlegel): ma-aji (W)
CBM-ZF 1590 (16, 85–111 mm SL), Apr. 4, 1991; 1793 (5, 108–111), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2058 (1, 123), June 11, 1991; 2073 (1, 131), June 12, 1991; 2083 (2, 122, 123), June 18, 1991, 35°44.5' N, 140°58.5' E, 60 m

Family Coryphaenidae

158. *Coryphaena hippurus* Linnaeus: shiira (S)
CBM-ZF 2291 (1, 280 mm SL), Nov. 14, 1991

Family Leiognathidae

159. *Leiognathus rivulatus* (Temminck et Schlegel): oki-hiiragi (S)
CBM-ZF 1634 (3, 44–52 mm SL), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1804 (2, 47, 55), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m

Family Bramidae

160. **Brama japonica* Hilgendorf: shimagatsuo (W)
May 8, 1991

Family Haemulidae

161. *Parapristipoma trilineatum* (Thunberg): isaki (S)
CBM-ZF 1679 (2, 172, 175 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m
162. *Plectorhinchus cinctus* (Temminck et Schlegel): koshôdai (W)
CBM-ZF 1757 (1, 195 mm SL), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m

Family Sparidae

163. *Acanthopagrus latus* (Houttuyn): kichinu (S)
CBM-ZF 2316 (1, 170 mm SL), Dec. 11, 1991
164. **Acanthopagrus schlegeli* (Bleeker): kurodai (W)
June 14, 1991
165. *Evynnis japonica* Tanaka: chidai (W)

CBM-ZF 1609 (4, 68–81 mm SL), Apr. 4, 1991; 1682 (2, 135, 147), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1795 (3, 50–68), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m; 2064 (1, 79), June 11, 1991; 2278 (1, 180), Oct. 30, 1991

166. *Pagrus major* (Temminck et Schlegel): madai (W)

CBM-ZF 2314 (1, 300), Dec. 6, 1991

Family Sciaenidae

167. *Argyrosomus argentatus* (Houttuyn): shiroguchi (W)

CBM-ZF 1705 (1, 197 mm SL), Dec. 14, 1990, 35°21.6' N, 141°01.5' E, 260 m; 2285 (1, 215), Nov. 8, 1991

168. *Nibea mitsukurii* (Jordan et Snyder): nibe (W)

CBM-ZF 2254 (1, 151 mm SL), Sept. 13, 1991

Family Mullidae

169. *Parupeneus chrysopleuron* (Temminck et Schlegel): umi-higo (S)

CBM-ZF 1693 (1, 204 mm SL), Dec. 4, 1990, 35°29.5' N, 140°54.0' E, 90 m

170. *Upeneus bensasi* (Temminck et Schlegel): himeji (W)

CBM-ZF 1717 (6, 73–83 mm SL), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m; 1796 (2, 77, 94), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m

Family Scorpididae

171. *Microcanthus strigatus* (Cuvier): kagokakidai (S)

CBM-ZF 1691 (1, 138 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 2312 (1, 141), Dec. 6, 1991

Family Pentacerotidae

172. *Pentaceros japonicus* Döderlein: tsubodai (S)

CBM-ZF 1789 (2, 104, 119 mm SL), Dec. 20, 1990, 35°24.4' N, 141°01.4' E, 170 m

Family Oplegnathidae

173. *Oplegnathus fasciatus* (Temminck et Schlegel): ishidai (W)

CBM-ZF 1583 (1, 127 mm SL), Apr. 4, 1991; 1686 (2, 146, 164), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 2283 (1, 196), Nov. 8, 1991

Family Embiotocidae

174. *Ditrema temmincki* Bleeker: umitanago (W)

CBM-ZF 2637 (3, 113–120 mm SL), Nov. 3, 1985, Togawa Fishery Port

175. *Neoditrema ransonneti* Steindachner: okitanago (S)

CBM-ZF 2050 (1, 175 mm SL), June 11, 1991

Family Cheilodactylidae

176. *Goniistius quadricornis* (Günther): yūdachi-takanoha (S)

CBM-ZF 1680 (1, 168 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m

177. *Goniistius zonatus* (Cuvier): takanohadai (S)

CBM-ZF 1681 (1, 195 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1756 (1, 218), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m; 1772 (1, 210), Dec. 21, 1990, 35°30.5' N, 140°52.5' E, 75 m; 2287 (1, 295), Nov. 14, 1991

Family Cepolidae

178. *Cepola schlegeli* (Bleeker): sumitsuki-akatachi (S)

CBM-ZF 1767 (1, 188 mm SL), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 65 m; 2265 (1, 292), Oct. 17, 1991, 35°45.5' N, 140°58.2' E, 60 m

Family Mugilidae

179. **Mugil cephalus cephalus* Linnaeus: bora (W)

May 8, 1991

Family Labridae

180. *Pseudolabrus japonicus* (Houttuyn): sasano-habera (S)

CBM-ZF 1698 (1, 151 mm SL), Dec. 4, 1990, 35°32.2' N, 140°47.5' E, 40 m; 2051 (2, 137, 185), June 11, 1991

Family Zoarcidae

181. *Lycodes caudimaculatus* Matsubara: irezumigaji (W)

CBM-ZF 1792 (1, 223 mm SL), Dec. 19, 1990, 35°20.6' N, 140°56.5' E, 190 m

Family Stichaeidae

182. *Stichaeus grigorjewi* Herzenstein: nagazuka (N)

CBM-ZF 2059 (1, 171 mm SL), June 11, 1991

Family Pholididae

183. *Pholis nebulosa* (Temminck et Schlegel): ginpo (W)

CBM-ZF 1596 (1, 197 mm SL), Apr. 4, 1991; 1648 (2, 110, 124), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 1799 (3, 200–225), May 8, 1991, 35°44.6' N, 140°58.2' E, 60 m

Family Zaproridae

184. *Zaprora silenus* Jordan: bōzuginpo (N)

CBM-ZF 876 (1, 610 mm SL), Mar. 30, 1988;

877 (1, 577), Apr. 15, 1988

Family Champsodontidae

185. *Champsodon snyderi* Franz: wanigisu (S)
CBM-ZF 1618 (1, 69 mm SL), Apr. 4, 1991;
1722 (2, 68, 83), Dec. 14, 1990, 35°21.6' N,
141°01.5' E, 260 m; 2066 (1, 81), June 11,
1991; 2092 (5, 40–87), June 18, 1991,
35°44.5' N, 140°58.5' E, 60 m

Family Uranoscopidae

186. *Gnathagnus elongatus* (Temminck et Schlegel): aomishima (S)
CBM-ZF 2087 (1, 125 mm SL), June 18, 1991,
35°44.5' N, 140°58.5' E, 60 m
187. *Uranoscopus chinensis* Guichenot: kibire-mishima (S)
CBM-ZF 1821 (1, 46 mm SL), May 8, 1991,
35°44.6' N, 140°58.3' E, 60 m
188. *Uranoscopus japonicus* Houttuyn: mishima-okoze (W)
CBM-ZF 1755, (1, 94 mm SL), Dec. 17, 1991,
35°40.8' N, 140°58.4' E, 65 m

Family Pinguipedidae

189. *Parapercis sexfasciata* Temminck et Schlegel: kurakake-toragisu (W)
CBM-ZF 1639 (1, 112 mm SL), Apr. 24, 1991,
35°39.6' N, 140°59.0' E, 65 m; 1816 (2, 114,
142), May 8, 1991, 35°44.6' N, 140°58.2' E,
60 m

Family Ammodytidae

190. *Ammodytes personatus* Girard: ikanago (W)
CBM-ZF 1605 (4, 168–183 mm SL), Apr. 4,
1991; 1646 (3, 139–188), Apr. 24, 1991,
35°39.6' N, 140°59.0' E, 65 m; 1725 (1, 187),
Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m;
1817 (3, 154–185), May 8, 1991, 35°44.6' N,
140°58.2' E, 60 m

Family Callionymidae

191. *Repomucenus huguenini* (Bleeker): yari-numeri (W)
CBM-ZF 1599 (2, 98, 115 mm SL), Apr. 4,
1991
192. *Repomucenus lunatus* (Temminck et Schlegel): numerigochi (W)
CBM-ZF 1600 (1, 136 mm SL), Apr. 4, 1991;
1640 (4, 97–110), Apr. 24, 1991, 35°39.6' N,
140°59.0' E, 65 m; 1726, 1727 (2, 116, 121),
Dec. 14, 1991; 1779 (1, 135), Dec. 19, 1990;
1811, 1812 (4, 91–105), May 8, 1991,
35°44.6' N, 140°58.2' E, 60 m
193. *Repomucenus ornatipinnis* (Regan): seto-numeri (W)

- CBM-ZF 1601 (8, 98–135 mm SL), Apr. 4,
1991; 1641 (2, 110, 114), Apr. 24, 1991,
35°39.6' N, 140°59.0' E, 65 m; 1689 (1, 148),
Dec. 2, 1990; 2072 (2, 91, 119), June 11, 1991;
2075 (1, 148), June 12, 1991; 2090 (2, 55, 100),
June 18, 1991, 35°44.5' N, 140°58.5' E, 45 m
194. *Repomucenus virgis* (Jordan et Fowler): horo-numeri (S)
CBM-ZF 1728 (2, 88, 89 mm SL), Dec. 14,
1990, 35°48.0' N, 140°57.4' E, 45 m; 2091
(5, 74–101), June 18, 1991, 35°44.5' N,
140°58.5' E, 60 m

Family Gobiidae

195. *Acanthogobius flavimanus* (Temminck et Schlegel): mahaze (W)
CBM-ZF 512, 513, 666 (3, 88–95 mm SL),
Sept. 27, 1986, Togawa Fishery Port
196. *Amblychaeturichthys hexanema* (Bleeker): akahaze (W)
CBM-ZF 1731 (1, 115 mm SL), Dec. 14, 1990,
35°48.0' N, 140°57.4' E, 45 m
197. *Amblychaeturichthys sciaenoides* (Jordan et Snyder): komochijako (W)
CBM-ZF 1807 (2, 74, 75 mm SL), May 8,
1991, 35°44.6' N, 140°58.2' E, 60 m

Family Siganidae

198. *Siganus fuscescens* (Houttuyn): aigo (W)
CBM-ZF 1752 (1, 113 mm SL), Dec. 17, 1990,
35°40.8' N, 140°58.4' E, 65 m

Family Sphyracidae

199. *Sphyracis pinguis* Günther: aka-kamasu (S)
CBM-ZF 1750 (1, 193 mm SL), Dec. 14, 1990,
35°48.0' N, 140°57.4' E, 45 m

Family Gempylidae

200. *Rexea prometheoides* (Bleeker): kagokamasu (S)
CBM-ZF 2086 (3, 196–203 mm SL), June 18,
1991, 35°44.5' N, 140°58.5' E, 60 m

Family Trichiuridae

201. *Trichiurus japonicus* Temminck et Schlegel: tachiuo (W)
CBM-ZF 2110 (1, 521 mm SL), June 18, 1991,
35°44.5' N, 140°58.5' E, 60 m

Family Scombridae

202. *Acanthocybium solandri* (Cuvier): kamasu-sawara (S)
Apr. 23, 1991
203. *Auxis rochei* (Risso): marusôda (S)
CBM-ZF 2260 (2, 203, 222 mm SL), Sept. 13,
1991

204. **Katsuwonus pelamis* (Linnaeus): katsuo (S)
Apr. 23, 1991
205. *Scomber japonicus* Houttuyn: masaba (W)
CBM-ZF 1820 (1, 209 mm SL), May 8, 1991,
35°44.6' N, 140°58.2' E, 60 m; 2052 (1, 245),
June 11, 1991; 2269 (4, 210–230), Oct. 21,
1991, 35°45.5' N, 140°58.2' E, 60 m
206. *Scomber australasicus* Cuvier: gomasaba (W)
CBM-ZF 1706 (1, 268 mm SL), Dec. 14, 1990,
35°48.0' N, 140°57.4' E, 45 m
207. *Scomberomorus niphonius* (Cuvier): sawara
(S)
CBM-ZF 2333 (1, 470 mm SL), Nov. 27, 1991
208. **Thunnus alalunga* (Bonnaterre): bin-naga (S)
March 14, 1994
209. **Thunnus albacares* (Bonnaterre): kihada (S)
Apr. 23, 1991
210. **Thunnus obesus* (Lowe): mebachichi (S)
March 14, 1994

Family Istiophoridae

211. **Makaira mazara* (Jordan et Snyder): kuro-
kajiki (S)
June 12, 1991
212. **Tetrapturus audax* (Philippi): makajiki (S)
Apr. 23, 1991

Family Xiphiidae

213. **Xiphias gladius* Linnaeus: mekajiki (S)
Jan. 24, 1994

Family Centrolophidae

214. *Hyperoglyphe japonica* (Döderlein): medai (W)
CBM-ZF 2289 (1, 325 mm SL), Nov. 14, 1991
215. *Psenopsis anomala* (Temminck et Schlegel):
ibodai (W)
CBM-ZF 1671 (2, 133, 138 mm SL), Dec. 2,
1990, 35°39.6' N, 140°59.0' E, 65 m; 2264 (1,
115), Oct. 17, 1991, 35°45.5' N, 140°58.2' E,
60 m

Order Pleuronectiformes

Family Paralichthyidae

216. *Paralichthys olivaceus* (Temminck et Schlegel): hirame (W)
CBM-ZF 1593 (1, 167 mm SL), Apr. 4, 1991;
1768 (2, 147, 167), Dec. 17, 1990
217. *Pseudorhombus pentophthalmus* Günther:
tama-ganzōbirame (W)
CBM-ZF 1626 (5, 52–172 mm SL), Apr. 4,
1991; 1650 (7, 69–147), Apr. 4, 1991,
35°39.6' N, 140°59.0' E, 65 m; 1742 (5, 55–
115), Dec. 14, 1990; 1814 (3, 99–144), May 8,
1991, 35°44.6' N, 140°58.2' E, 60 m; 2102
(3, 71–160), June 18, 1991, 35°44.5' N,
140°58.5' E, 60 m

218. *Tarphos oligolepis* (Bleeker): aramegare (W)
CBM-ZF 1743 (1, 57 mm SL), Dec. 14, 1990,
35°48.0' N, 140°57.4' E, 45 m

Family Bothidae

219. *Crossorhombus kobensis* (Jordan et Starks):
kōbedarumagare (S)
CBM-ZF 1622, 1628, 1629 (4, 65–85 mm SL),
Apr. 4, 1991; 1653, 1654, (11, 65–95), Apr. 4,
1991, 35°39.6' N, 140°59.0' E, 65 m; 1803,
1809, 1813 (7, 65–92), May 8, 1991, 35°44.6'
N, 140°58.2' E, 60 m; 2060 (1, 85), June 11,
1991; 2104 (1, 75), June 18, 1991, 35°44.5' N,
140°58.5' E, 60 m
220. *Laeops kitaharae* (Smith et Pope): yarigare (S)
CBM-ZF 1625 (1, 108 mm SL), Apr. 4, 1991;
1652 (3, 110–125), Apr. 24, 1991, 35°39.6' N,
140°59.0' E, 65 m; 1739 (7, 57–125), Dec. 14,
1990; 1802 (2, 110, 113), May 8, 1991,
35°44.6' N, 140°58.2' E, 60 m; 2089 (3, 103–
129), June 18, 1991, 35°44.5' N, 140°58.5' E,
60 m

Family Pleuronectidae

221. **Clidoderma asperrimum* (Temminck et Schlegel): samegare (W)
June 11, 1991
222. *Dexistes rikuzenius* (Jordan et Starks): migi-
gare (W)
CBM-ZF 1741 (1, 160 mm SL), Dec. 14, 1990,
35°48.0' N, 140°57.4' E, 45 m; 1785 (1, 142),
Dec. 22, 1990, 35°29.3' N, 141°10.0' E, 180 m;
2071 (1, 172), June 11, 1991; 2103 (2, 89, 148),
June 18, 1991, 35°44.5' N, 140°58.5' E, 90 m
223. *Eopsetta grigorjewi* (Herzenstein): mushigare (W)
CBM-ZF 2294 (1, 290 mm SL), Nov. 20, 1991;
2306 (1, 245), Dec. 4, 1990, 35°29.5' N,
140°54.0' E, 90 m
224. *Glyptocephalus stelleri* (Schmidt): hireguro
(W)
CBM-ZF 1700 (2, 149, 151 mm SL), Dec. 6,
1990, 35°48.0' N, 140°55.0' E, 50 m
225. *Kareius bicoloratus* (Basilevsky): ishigare (W)
CBM-ZF 2286 (1, 290 mm SL), Nov. 14, 1991
226. *Microstomus achne* (Jordan et Starks): baba-
gare (W)
CBM-ZF 2288 (1, 340 mm SL), Nov. 14, 1991
227. *Platichthys stellatus* (Pallas): numagare (N)
CBM-ZF 2336 (1, 377 mm SL), Nov. 20, 1991
228. *Pleuronectes yokohamae* (Günther): mako-
gare (W)
CBM-ZF 2307 (1, 225 mm SL), Dec. 4, 1990,
35°33.6' N, 140°58.4' E, 90 m; 2315 (1, 225),

- Dec. 11, 1991
229. *Pleuronichthys cornutus* (Temminck et Schlegel): meitagarei (W)
CBM-ZF 1624 (1, 109 mm SL), Apr. 4, 1991; 1740 (1, 131), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m; 2257 (1, 98), Sept. 13, 1991
230. *Tanakius kitaharai* (Jordan et Starks): yanagimushigarei (W)
CBM-ZF 2313 (2, 196, 231 mm SL), Dec. 6, 1991
231. *Verasper variegatus* (Temminck et Schlegel): hoshigarei (W)
CBM-ZF 752 (1, 247 mm SL), Dec. 14, 1987
- Family Soleidae
232. *Aesopia cornuta* Kaup: tsuno-ushinoshita (S)
CBM-ZF 1670 (1, 154 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m
233. *Heteromycteris japonica* (Temminck et Schlegel): sasa-ushinoshita (S)
CBM-ZF 1621 (5, 54–86 mm SL), Apr. 4, 1991; 1651 (1, 112), Apr. 24, 1991, 35°39.6' N, 140°59.0' E, 65 m; 2105 (1, 83), June 18, 1991, 35°44.5' N, 140°58.5' E, 50 m
234. *Zebrias zebra* (Bloch): shima-ushinoshita (W)
CBM-ZF 2077 (1, 207 mm SL), June 12, 1991; 2259 (1, 180), Sept. 13, 1991
- Family Cynoglossidae
235. *Cynoglossus joyneri* Günther: aka-shita-birame (S)
CBM-ZF 1763 (1, 165 mm SL), Dec. 17, 1990, 35°40.8' N, 140°58.4' E, 50 m; 2049 (1, 161), June 11, 1991
236. *Paraplagusia japonica* (Temminck et Schlegel): kuro-ushinoshita (W)
CBM-ZF 1623 (1, 165 mm SL), Apr. 4, 1991
- Order Tetraodontiformes
Family Triacanthodidae
237. *Triacanthodes anomalus* (Temminck et Schlegel): benikawamuki (S)
CBM-ZF 1585 (5, 26–42 mm SL), Apr. 4, 1991; 1738 (1, 35), Dec. 14, 1990, 35°28.6' N, 140°59.5' E, 120 m
- Family Triacanthidae
238. *Triacanthus biaculeatus* (Bloch): gima (S)
CBM-ZF 1692 (1, 230 mm SL), Dec. 4, 1990, 35°47.8' N, 141°01.4' E, 120 m
- Family Balistidae
239. **Canthidermis maculata* (Bloch): amimon-gara (W)
Apr. 23, 1991
240. *Stephanolepis cirrhifer* (Temminck et Schlegel): kawahagi (W)
CBM-ZF 1603 (3, 56–108 mm SL), Apr. 4, 1991; 1690 (1, 153), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1713 (1, 98), Dec. 14, 1990, 35°48.0' N, 140°57.4' E, 45 m; 1784 (1, 97), Dec. 9, 1990, 35°36.0' N, 140°59.8' E, 75 m; 2305 (1, 198), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m
241. *Thamnaconus hypargyreus* (Cope): sarasahagi (S)
CBM-ZF 1676 (1, 107 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 2296 (1, 120), Nov. 20, 1991
242. *Thamnaconus modestus* (Günther): umazurahagi (W)
CBM-ZF 1594 (1, 156 mm SL), Apr. 4, 1991; 1672 (2, 205, 206), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 2062 (1, 163), June 11, 1991
- Family Aracanidae
243. *Kentrocapros aculeatus* (Houttuyn): itomakifugu (S)
CBM-ZF 1631 (1, 31 mm SL), Apr. 24, 1991, 35°55.8' N, 140°54.0' E, 65 m
- Family Tetraodontidae
244. *Arothron firmamentum* (Temminck et Schlegel): hoshifugu (S)
CBM-ZF 2258 (1, 113 mm SL), Sept. 13, 1991
245. *Canthigaster rivulata* (Temminck et Schlegel): kitamakura (S)
CBM-ZF 2271 (1, 65 mm SL), Oct. 21, 1991, 35°45.5' N, 140°58.2' E, 60 m
246. *Lagocephalus gloveri* Abe et Tabeta: kuro-sabafugu (W)
CBM-ZF 2301 (1, 270 mm SL), Nov. 27, 1991
247. *Lagocephalus inermis* (Temminck et Schlegel): kanafugu (S)
CBM-ZF 2297 (1, 172 mm SL), Nov. 20, 1991
248. *Lagocephalus scleratus* (Gmelin): sen-nin-fugu (S)
CBM-ZF 5493 (1, 420 mm SL), May 25, 1994
249. *Lagocephalus wheeleri* Abe, Tabeta et Kitahama: shiro-sabafugu (W)
CBM-ZF 1684 (2, 154, 157 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1714 (2, 210, 225), Dec. 14, 1990, 35°34.5' N, 140°58.4' E, 80 m
250. *Sphoeroides pachygaster* Müller et Troschel: yoritofugu (S)
CBM-ZF 1685 (1, 226 mm SL), Dec. 2, 1990, 35°39.6' N, 140°59.0' E, 65 m; 1704 (2, 190, 192), Dec. 14, 1990, 35°28.6' N, 140°59.5' E, 120 m
251. *Takifugu niphobles* (Jordan et Snyder): kusa-

- fugu (W)
CBM-ZF 1760 (1, 160 mm SL), Dec. 17, 1990,
35°37.2' N, 140°56.5' E, 40 m; 2053 (1, 111),
June 11, 1991; 2311 (1, 133), Dec. 6, 1991
252. *Takifugu pardalis* (Temminck et Schlegel):
higanfugu (S)
CBM-ZF 5494 (1, 267 mm SL), May 25, 1994
253. *Takifugu poecilonotus* (Temminck et Schlegel):
komonfugu (W)
CBM-ZF 1712 (1, 116 mm SL), Dec. 14, 1990,
35°34.5' N, 140°58.4' E, 80 m; 2321 (1, 157),
Dec. 11, 1991
254. *Takifugu porphyreus* (Temminck et Schlegel):
mafugu (W)
CBM-ZF 2324 (1, 240 mm SL), Dec. 25, 1991
255. *Takifugu rubripes* (Temminck et Schlegel):
torafugu (S)
CBM-ZF 2293 (1, 330 mm SL), Nov. 14, 1991
256. *Takifugu stictonotus* (Temminck et Schlegel):
gomafugu (W)
CBM-ZF 2309 (1, 240 mm SL), Dec. 17, 1990,
35°40.8' N, 140°58.4' E, 65 m; 2320 (1, 285),
Dec. 11, 1991
257. *Takifugu snyderi* (Abe): shōsaifugu (W)
CBM-ZF 2282 (1, 145 mm SL), Nov. 8, 1991;
2302 (1, 156), Nov. 27, 1991

Family Molidae

258. **Mola mola* (Linnaeus): manbō (W)
May 8, 1991

Discussion

A total of 258 fish species (including an apparently undescribed and previously unknown lophiid) representing 118 families were recognized off Choshi. Undoubtedly, more species remain to be recorded, owing to insufficient collection of inshore or oceanic deep-sea midwater fishes, which are not well represented. Therefore, additional sampling methods should be employed in the future for a more complete assessment of the ichthyofaunal composition of the area.

Of the 257 identified species, 18 (7.0%) and 134 (52.1%) have their distribution centers located in northern and southern Japan (north and south of the peninsula), respectively, whereas the remaining 104 species (40.9%) are relatively wide-ranging, extending the length of Japan. Although the three categories are arbitrary and the percentages based mainly on shallow coastal and deep-sea benthopelagic and benthic fishes, such categorization is considered helpful in chara-

cterizing the zoogeographic features of the area.

The occurrences of northern species, as opposed to the southern species, were notable, owing to the absence of the former in the ichthyofaunal surveys off the southernmost parts of the Boso Peninsula (Miya *et al.*, 1994a, b), which recognized 191 coastal fishes from set-net catches, comprising 70% and 30% southern and wide-ranging species, respectively. The presence of cold, less saline waters originating from the Oyashio current below the Kuroshio current flowing northward along the Boso Peninsula (Yang *et al.*, 1993a, b), could well be responsible for this phenomenon, since, although there is no direct evidence substantiating relationships between temporal/spatial oceanographic features and the occurrence of northern species, it seems significant that of the 18 northern species, more than half (10 spp.) were deep-sea benthic or benthopelagic (*Hydrolagus barbouri*, *Centroscyllium ritteri*, *Chlorophthalmus borealis*, *Antimora microlepis*, *Laemonema longipes*, *Theragra chalcogramma*, *Sebastes matsubarae*, *Sebastolobus macrochir* and *Erilepis zonifer*), or deep-sea midwater fishes (*Lampanyctus jordani*). This is especially so considering that the effects of the Oyashio waters are more constant and pronounced in deeper zones (>200 m) compared with those in more coastal, shallower areas (Yang *et al.*, 1993a).

The predominance of southern species (52.1%) is more plausible, because the warm Kuroshio current originating in the equatorial Pacific strongly and constantly flows along the eastern coast of the Boso Peninsula. Their representation off Choshi, however, differs qualitatively from those recorded off Aino-hama or Chitose, the southernmost parts of the peninsula (Miya *et al.*, 1994a, b), although the numbers of southern species recorded were almost identical (133 spp. in Aino-hama+Chitose vs. 134 spp. in Choshi). Families having tropical and subtropical distributions, such as Chaetodontidae and Pomacentridae, were not recorded during the present survey, although adults of some species were occasionally abundant in Aino-hama or Chitose. Therefore, the effects of the Kuroshio current off Choshi seem to be less pronounced than off the more southern parts of

the peninsula.

For a more complete list of the fishes from Choshi, those that were reported in Tamura *et al.* (1962) or Taniuchi (1984), but not listed in the present study, are shown in Appendix 1. In this list, only fishes that were unlikely to be misidentified or subject to taxonomic confusion, and that were directly observed by the author(s), are included. Tamura *et al.* (1962) listed 257 species from Choshi, including both scientific and Japanese names, being based mostly on catches landed at the Choshi Fishery Market, and supplemented by juveniles taken from tidepools and literature records, although none were accompanied by voucher specimens. Taniuchi (1984), on the other hand, listed 71 species of sharks and rays from Choshi, in which he clearly indicated the basis of each record (specimens observed or collected, or literature records). As a result, a further 124 species, representing 70 families, are recognized, resulting in a total of 382 species, representing 158 families, being recorded off Choshi. Of the 124 species, northern, southern and wide-ranging species occupy 5.6% (7 spp.), 69.4% (86 spp.) and 25.0% (31 spp.), respectively. The higher ratio of southern species apparently results from a number of tidepool fishes, intensively collected by Tamura *et al.* (1962), but not comprehensively sampled during the present study.

Acknowledgments

This study would not have been possible without the assistance in collecting specimens given by Y. Nukaya, a fisherman of Choshi. Several inshore fishes were collected by K. Yashiro. Bo Fernholm, Swedish Natural History Museum, identified hagfish specimens. We are most appreciative of their kindness and generosity.

References

- Caruso, J. H. 1981. The systematics and distribution of the lophiid anglerfishes: I. A revision of the genus *Lophiodes* with the description of two new species. *Copeia* 1981(3): 522–549.
- Baba, O., T. Taniuchi and Y. Nose. 1987. Depth distribution and food habits of three species of small squaloid sharks off Choshi. *Nippon Suisan Gakkaishi* 53(3): 417–424. (In Japanese with English abstract)
- Chen, C., T. Taniuchi and Y. Nose. 1979. Blainvilles dogfish, *Squalus blainville*, from Japan, with notes on *S. mitsukurii* and *S. japonicus*. *Japan. J. Ichthyol.* 26(1): 26–42.
- Chen, C., T. Taniuchi and Y. Nose. 1981. Some aspects of reproduction in the pointed snout dogfish *Squalus japonicus* taken off Nagasaki and Choshi. *Bull. Japan. Soc. Sci. Fish.* 47(9): 1157–1164.
- Ishihara, H. 1987. Revision of the western North Pacific species of the genus *Raja*. *Japan. J. Ichthyol.* 34(3): 241–285.
- Ishiyama, R. 1967. Fauna Japonica. Rajidae (Pisces). Biogeogr. Soc. Japan, Tokyo. vi+84 pp., 32 pls.
- Kuo, C.-H., K.-F. Huan and H.-K. Mok 1994. Hagfishes of Taiwan (I): A taxonomic revision with description of four new *Paramyxine* species. *Zool. Studies* 33(2): 126–139.
- Masuda, H., K. Amaoka, C. Araga, T. Uyeno and T. Yoshino (eds.). 1984. The fishes of the Japanese Archipelago. Vols. 1 (English text) and 2 (pls.). Tokai Univ. Press, Tokyo. xxii+437 pp.
- Miya, M., E. Higashitarumizu, T. Gonoï, T. Sunobe and K. Mochizuki. 1994a. Fishes of the Boso Peninsula—I. Coastal fishes taken by set net off Aino-hama, Tateyama. *J. Nat. Hist. Mus. Inst., Chiba* 3(1): 109–118.
- Miya, M., E. Higashitarumizu, T. Gonoï, T. Sunobe and K. Mochizuki. 1994b. Fishes of the Boso Peninsula—II. Coastal fishes taken by set net off Chitose, Chikura. *J. Nat. Hist. Mus. Inst., Chiba* 3(1): 119–128.
- Nakabo, T. (ed.) 1993. Fishes of Japan with pictorial keys to the species. Tokai Univ. Press, Tokyo. xxxiv+1474 pp. (In Japanese)
- Suda, Y., H. Tachikawa and O. Baba. 1986. Adult form of the stromateoid fish, *Nomeus gronovii*, from the North Pacific. *Japan. J. Ichthyol.* 33(3): 319–322.
- Tamura, K., N. Takagi, S. Tsuruoka and N. Masuda. 1962. Fishes in the Choshi area, Report 1. *Bull. Choshi Mar. Lab., Chiba Univ.* (4): 62–75. (In Japanese)
- Taniguchi, N., A. Ochiai and T. Miyazaki. 1972. Comparative studies of the Japanese platycephalid fishes by electropherograms of muscle proteins, LDH and MDH. *Japan. J. Ichthyol.* 19(2): 89–96.
- Taniuch, T. 1984. Distribution of elasmobranchs in Choshi, Izu Islands, and Ogasawara Islands. pp. 14–24. *In* Report of a preliminary investigation on sharks and rays in the western Pacific Ocean. Japanese Group for Elasmobranch Studies, Spec. Publ. No. 1.

- Taniuchi, T. 1988. Aspects of reproduction and food habits of the Japanese swellshark *Cephaloscyllium umbratile* from Choshi, Japan. Nippon Suisan Gakkaishi 54(4): 627-633.
- Taniuchi, T., N. Kuroda and Y. Nose. 1983. Age, growth, reproduction, and food habits of the star-spotted dogfish *Mustelus manazo* collected from Choshi. Bull. Japan. Soc. Sci. Fish. 49(9): 1325-1334.
- Yamada, U. 1993. Family Synodontidae. pp. 309-313, 1272-1273. In T. Nakabo (ed.), Fishes of Japan with pictorial keys to the species. Tokai Univ. Press, Tokyo. (In Japanese)
- Yamakawa, T., T. Taniuchi and Y. Nose. 1986. Review of the *Etmopterus lucifer* group (Squalidae) in Japan. pp. 197-207. In T. Uyeno, R. Arai, T. Taniuchi and K. Matsuura (eds.), Indo-Pacific fish biology. Ichthyol. Soc. Japan, Tokyo.
- (Accepted on 13 October 1994)

房総半島産の魚類—III 銚子沖合の沿岸性ならびに深海性魚類

宮 正樹¹⁾・東方央樹^{2), 3)}・望月賢二¹⁾

¹⁾ 千葉県立中央博物館

〒260 千葉市中央区青葉町 955-2

²⁾ 東海大学海洋学部

〒424 清水市折戸 3-20-1

³⁾ 現住所: 〒260 千葉市中央区中央港 2-4-6

銚子漁港に水揚げされた主として底生性のものからなる沿岸性ならびに深海性魚類を調査した結果、118科からなる258種の魚類(未記載種と思われるアンコウ科魚類1種を含む)が確認された。同定できた257種のうちの18種(7.0%)は分布の中心を北日本(房総半島より北)にもつ北方種、134種(52.1%)は分布の中心を南日本(房総半島より南)にもつ南方種、また残りの104種(40.9%)は南北日本に広く分布する広域種であった。このように南方種が優占し、北方種がわずかであるとはいえ出現する傾向は、房総半島沖合沿いを北上する黒潮とその下層に存在する親潮系水の影響を受けたものであると考えられた。

Appendix 1. Fishes from Choshi that were reported in literatures but not listed in the present study. Sharks and rays (No. 1–40) and bony fishes (No. 41–124) are cited from Taniuchi (1984) and Tamura *et al.* (1962), respectively, with some nomenclatural changes according to those of Nakabo (1993) and other recent studies (see footnotes). Only those that are not apt to be misidentified, with no taxonomic confusion, and that are directly observed by the author(s), are listed. Distribution patterns are designated by N, S and W in parentheses after the Japanese names.

Chondrichthyes

Heterodontidae

1. *Heterodontus japonicus* (MacLay et MacLay): nekozame (S)

Odontaspidae

2. *Odontaspis ferox* (Risso): ôwanizame (S)

Cetorhinidae

3. *Cetorhinus maximus* (Gunnerus): ubazame (W)¹

Alopiidae

4. *Alopias pelagicus* Nakamura: nitari (S)
5. *Alopias superciliosus* (Lowe): hachiware (S)

Scyliorhinidae

6. *Apristurus japonicus* Nakaya: nihon-herazame (S)
7. *Apristurus macrorhynchus* (Tanaka): naga-herazame (S)
8. *Apristurus platyrhynchus* (Tanaka): herazame (S)
9. *Parmaturus pilosus* Garman: imorizame (S)

Triakidae

10. *Hemitriakis japonica* (Müller et Henle): eirakubuka (S)
11. *Mustelus griseus* Pietschmann: shirozame (S)

Carcharhinidae

12. *Carcharhinus longimanus* (Poey): yogore (S)
13. *Carcharhinus macroti* (Müller et Henle): hokosaki (S)
14. *Carcharhinus obscurus* (Le Sueur): dotabuka (S)

Sphyrnidae

15. *Sphyrna lewini* (Griffith et Smith): aka-shumokuzame (S)

Chlamydoselachidae

16. *Chlamydoselachus anguineus* Garman: rabuka (W)

Hexanchidae

17. *Hexanchus griseus* (Bonnaterre): kagurazame (S)

Dalatiidae

18. *Dalatias licha* (Bonnaterre): yoroizame (S)

Centrophoridae

19. *Centrophorus acus* Garman: tarôzame (S)
20. *Centrophorus squamosus* (Bonnaterre): momijizame (S)
21. *Deania calcea* (Lowe): hera-tsunoizame (S)

Squalidae

22. *Cirrhigaleus barbifer* Tanaka: hige-tsunoizame (S)
23. *Squalus acanthias* Linnaeus: abura-tsunoizame (W)
24. *Squalus* sp.: hiretaka-tsunoizame (S)

Squatinae

25. *Squatina nebulosa* Regan: koroizame (W)

Torpedinidae

26. *Narke japonica* (Temminck et Schlegel): shibire-ei (S)
27. *Torpedo tokionis* (Tanaka): yamato-shibire-ei (W)

Platyrrhinidae

28. *Platyrrhinus sinensis* (Schneider): uchiwazame (S)

Rajidae²

29. *Bathyrhina diplotaenia* (Ishiyama): ribon-kasube (N)³
 30. *Bathyrhina isotrachys* (Günther): charenjâ-kasube (W)
 31. *Bathyrhina matsubaraei* (Ishiyama): matsubara-ei (N)
 32. *Raja gigas* Ishiyama: zô-kasube (S)³
-

Appendix 1. (continued)

-
- 33. *Raja kenojei* Günther: komon-kasube (W)
 - 34. *Raja kwangtungensis* Zhu: gangi-ei (W)
 - 35. *Raja macrocauda* Ishiyama: kitsune-kasube (S)³
 - 36. *Raja meerdervoortii* Bleeker: medama-kasube (S)³
 - 37. *Rhinoraja kujiensis* (Tanaka): kuji-kasube (W)³
 - 38. *Rhinoraja longicauda* Ishiyama: onaga-kasube (N)³
 - Urolophidae
 - 39. *Urolophus aurantiacus* (Müller et Henle): hirata-ei (S)
 - Gymnuridae
 - 40. *Gymnura japonica* (Temminck et Schlegel): tsbakuro-ei (S)
 - Osteichthyes
 - Anguillidae
 - 41. *Anguilla japonica* Temminck et Schlegel: unagi (W)
 - Muraenidae
 - 42. *Gymnothorax kidako* (Temminck et Schlegel): utsubo (S)
 - 43. *Muraena pardalis* Temminck et Schlegel: tora-utsubo (S)
 - Ophichthidae
 - 44. *Ophisurus macrorhynchus* Bleeker: dainan-umihebi (S)
 - Muraenesocidae
 - 45. *Muraenesox cinereus* (Forsskål): hamo (S)
 - Plotosidae
 - 46. *Plotosus lineatus* (Thunberg): gonzui (S)
 - Salangidae
 - 47. *Salangichthys microdon* Bleeker: shira-uo (W)
 - Antennariidae
 - 48. *Histrio histrio* (Linnaeus): hana-okoze (W)
 - Atherinidae
 - 49. *Hypoatherina valenciennei* (Bleeker): tōgoro-iwashi (S)
 - Hemiramphidae
 - 50. *Hyporhamphus sajori* (Temminck et Schlegel): sayori (W)
 - Belonidae
 - 51. *Ablennes hians* (Valenciennes): hamadatsu (W)
 - Monocentrididae
 - 52. *Monocentris japonica* (Houttuyn): matsukasa-uo (S)
 - Fistulariidae
 - 53. *Fistularia petimba* Lacepède: aka-yagara (S)
 - Syngnathidae
 - 54. *Hippocampus coronatus* Temminck et Schlegel: tatsuno-otoshigo (W)
 - 55. *Hippocampus japonicus* Kaup: sango-tatsu (W)
 - 56. *Hippocampus takakurai* Tanaka: takakura-tatsu (S)
 - Scorpaenidae
 - 57. *Sebastes nivosus* Hilgendorf: goma-soi (N)
 - 58. *Sebastes schlegeli* Hilgendorf: kuro-soi (W)
 - 59. *Sebastes trivittatus* Hilgendorf: shima-zoi (N)
 - Synanceiidae
 - 60. *Inimicus japonicus* (Cuvier): oni-okoze (S)
 - Cyclopteridae
 - 61. *Lethotremus awae* Jordan et Snyder: dango-uo (W)
 - Liparidae
 - 62. *Crystallichthys matsushimae* (Jordan et Snyder): aba-chan (N)
 - Serranidae
 - 63. *Epinephelus awoara* (Temminck et Schlegel): ao-hata (S)
 - 64. *Epinephelus fasciatus* (Forsskål): aka-hata (S)
 - 65. *Sacura margaritacea* (Hilgendorf): sakuradai (S)
-

Appendix 1. (continued)

-
- Terapontidae
66. *Rhyncopelates oxyrhynchus* (Temminck et Schlegel): shima-isaki (S)
- Kuhliidae
67. *Kuhlia mugil* (Schneider): gin-yugoi (S)
- Apogonidae
68. *Apogon semilineatus* Temminck et Schlegel: nenbutsudai (S)
- Carangidae
69. *Alectis ciliaris* (Bloch): itohiki-aji (S)
70. *Decapterus muroadsi* (Temminck et Schlegel): muro-aji (S)
71. *Megalaspis cordyla* (Linnaeus): oni-aji (S)
72. *Naucrates ductor* (Linnaeus): burimodoki (W)
73. *Pseudocaranx dentex* (Bloch et Schneider): shima-aji (S)
74. *Seriola dumerili* (Risso): kanpachi (S)
75. *Seriola lalandi* Valenciennes: hiramasa (W)
76. *Uraspis helvola* (Forster): oki-aji (S)
- Menidae
77. *Mene maculata* (Bloch et Schneider): gin-kagami (S)
78. *Leiognathus nuchalis* (Temminck et Schlegel): hiiragi (S)
- Haemulidae
79. *Hapalogenys nigropinnis* (Temminck et Schlegel): higedai (S)
- Sparidae
80. *Sparus sarba* (Forsskål): hedai (S)
- Lethrinidae
81. *Gymnocranius griseus* (Temminck et Schlegel): meichidai (S)
- Girellidae
82. *Girella mezina* Jordan et Starks: okina-mejina (S)
83. *Girella punctata* Gray: mejina (S)
- Kyphosidae
84. *Kyphosus vaigiensis* (Quoy et Gaimard): isuzumi (S)
- Ephippidae
85. *Platax teira* (Forsskål): tsubame-uo (S)
- Chaetodontidae
86. *Chaetodon auriga* Forsskål: toge-chôchô-uo (S)
87. *Chaetodon auripes* Jordan et Snyder: chôchô-uo (S)
88. *Chaetodon lunura* (Lacepède): chô-han (S)
89. *Chaetodon modestus* Temminck et Schlegel: genrokudai (S)
90. *Chaetodon vagabundus* Linnaeus: fûrai-chôchô-uo (S)
91. *Heniochus acuminatus* (Linnaeus): hatatatedai (S)
- Pentacerotidae
92. *Eivistias acutirostris* (Temminck et Schlegel): tengudai (S)
- Oplegnathidae
93. *Oplegnathus punctatus* (Temminck et Schlegel): ishigakidai (S)
- Pomacentridae
94. *Abudefduf notatus* (Day): iso-suzumedai (S)
95. *Abudefduf sexfasciatus* (Lacepède): rokusen-suzumedai (S)
96. *Abudefduf sordidus* Forsskål: shima-suzumedai (S)
97. *Abudefduf vaigiensis* Quoy et Gaimard: oyabiccha (S)
98. *Chromis notata notata* (Temminck et Schlegel): suzumedai (S)
- Mugilidae
99. *Chelon haematocheilus* (Temminck et Schlegel): menada (W)
- Labridae
100. *Halichoeres poeiopterus* (Temminck et Schlegel): kyûsen (W)
101. *Semicossyphus reticulatus* (Valenciennes): kobudai (W)
- Stichaeidae
102. *Dictyosoma burgeri* Van der Hoeven: dainan-ginpo (W)
-

Appendix 1. (continued)

-
- Pinguipedidae
 103. *Parapercis multifasciata* Döderlein: oki-toragisu (S)
 Blenniidae
 104. *Omobranchus elegans* (Steindachner): nabeka (W)
 Gobiidae
 105. *Chasmichthys dolichognathus* (Hilgendorf): ago-haze (W)
 106. *Chasmichthys gulosus* (Guichenot): dorome (W)
 107. *Pterogobius zacalles* Jordan et Snyder: ryûgû-haze (W)
 Acanthuridae
 108. *Prionurus scalprum* Valenciennes: nizadaï (S)
 Istiophoridae
 109. *Istiophorus platypterus* (Shaw et Nodder): bashô-kajiki (S)
 Stromateidae
 110. *Pampus argenteus* (Euphrasen): managatsuo (S)
 Nomeidae
 111. *Nomeus gronovii* (Gmelin): eboshidai (S)⁴
 Tetragonuridae
 112. *Tetragonurus cuvieri* Risso: doku-uroko-ibodai (W)
 Echeneididae
 113. *Echeneis naucrates* Linnaeus: koban-zame (S)
 114. *Remorina albescens* (Temminck et Schlegel): shiro-koban (S)
 Pleuronectidae
 115. *Pleuronectes herzensteini* Jordan et Snyder: magarei (W)
 116. *Verasper moseri* Jordan et Gilbert: matsukawa (N)
 Monacanthidae
 117. *Aluterus monoceros* (Linnaeus): usuba-hagi (S)
 Ostraciidae
 118. *Lactoria diaphana* (Bloch et Schneider): umisuzume (S)
 119. *Ostracion immaculatus* Temminck et Schlegel: hakofugu (W)
 Tetraodontidae
 120. *Arothron hispidus* (Linnaeus): sazanamifugu (S)
 121. *Lagocephalus lagocephalus oceanicus* Jordan et Fowler: kumasakafugu (S)
 122. *Takifugu xanthopterus* (Temminck et Schlegel): shima-fugu (S)
 Diodontidae
 123. *Diodon holocanthus* Linnaeus: harisenbon (S)
 124. *Chilomycterus reticulatus* (Linnaeus): ishigakifugu (S)
-

¹ Cited from Tamura *et al.* (1962); ² *Raja fusca* Garman is excluded because it is a junior synonym of *Raja kenojei* Günther (Ishihara, 1987) listed herein; ³ cited from Ishiyama (1967); ⁴ cited from Suda *et al.* (1986).