

List of the specimens of family Sphyraenidae (Actinopterygii: Teleostei) deposited in the Department of Zoology, The University Museum, The University of Tokyo

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Abstract

A total of 224 specimens in 198 lots, representing 10 species of Sphyraenidae, are held in the Department of Zoology, The University Museum, The University of Tokyo. No types are known for the family in the collection. A list of specimens is provided, including all available data, with remarks on some species. An example of *Sphyraena arabiansis* represents the first record of that species from Malaysia.

Introduction

The barracudas included in the family Sphyraenidae are currently regarded as comprising single Recent and fossil genera (Ballen 2019), the family being diagnosed by two widely separated dorsal fins without finlets, a cylindrical body with a long pointed head, and canine-like teeth on both jaws and the palatines (Senou 2001, 2013). Included extant species are distributed world-wide in tropical and temperate seas (Ballen 2019), some being abundantly caught and commercially important (Senou 2001; Russell 2002, 2016; Chiang et al. 2014; Miki 2019b; Hata 2020). However, human consumption of some large-bodied sphyraenid species have been known to result in ciguatera poisoning (Hashimoto 1956; Geller et al. 1991; Matta et al. 1999; Noguchi 2004). Accordingly, *Sphyraena barracuda* (Edwards, 1771) is prohibited from being sold as food in Japan (Ministry of Health and Welfare 1953). Attacks on swimmers by large barracudas have also been reported (de Silva 1963; DeLuca 2014).

The phylogenetic position of Sphyraenidae has been fluid, the family having been included in the suborder Mugiloidei (Jordan and Hubbs 1919; Matsubara 1955; Gosline 1971), and more recently, Scombroidei (Senou 2001, 2013; Russell 2002, 2016). Although the phylogenetic position of Sphyraenidae has not yet been clarified, relationships with several families, including Lactariidae, Centropomidae, and Latidae, have been suggested (Mirande 2016; Rabosky et al. 2018; Girard et al. 2020).

During a survey of the fish collection deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT), numerous specimens of the family collected from various areas were found, and are listed herein.

Materials and Methods

Sphyraenid specimens in the Department of Zoology, The University Museum, The University of Tokyo (abbreviated as ZUMT) were identified during the present study following Senou (2001, 2013), Doiuchi and Nakabo (2005), Morishita et al. (2020a, b) and Morishita and Motomura (2020). Data included in parentheses following registration numbers are as follows: specimen counts, standard length; collection locality; collection date; and collector. Collection data of specimens are omitted if the same as that for the following specimen. Remarks are also given where applicable. The collection year and collector for some specimens was estimated by following Koeda et al. (2022).

The ZUMT specimens listed herein were stored in Room 406 (specimen storage room) in the museum building. Most were stored in shelved containers, although some larger specimens were stored in a glass tank (labelled “Sphyraenidae”; glass lid sealed with a silicon adhesive) in the same room (as of Mar. 2022). Although some of the ZUMT specimens collected by Dr. Tokiharu Abe (most with collection data missing) had not been registered into the ZUMT collection, they are listed herein together with their ZUMT ABE number (underlined number written on specimen label), in the hope that Dr. Abe’s catalog books with collection data will be rediscovered in the future. Of the latter specimens, those labelled between ZUMT ABE 2700 to 6000 were collected from Palau by Dr. Abe between 1936 and 1937 (Koeda et al. 2022).

Results

A total of 198 lots comprising 224 specimens of 10 sphyraenid species were confirmed in the ZUMT fish collection. No types of nominal species were found. However, the distribution of *Sphyraena arabiansis* was newly confirmed based on a ZUMT specimen (see Remarks under that species), and the distributional patterns of some barracudas in Japan in the early 20th century were partially revealed.

Species accounts

Family Sphyraenidae カマス科

Sphyraena arabiansis Abdussamad & Retheesh, 2015 ヤシヤカマス

MALAYSIA

ZUMT 62660 (Fig. 1) [289.0 mm; probably Sarawak State; tagged as “P130”; donated in 1960 by Tom Harrisson (Sarawak Museum) to I. Tomiyama]

Remarks: *Sphyraena arabiansis* has been recorded only from Lakshadweep Islands (southeastern Arabian Sea), southern Japan, and New Caledonia (Abdussamad et al., 2015; Morishita et al. 2020b), the present specimen therefore representing the first record of the species from Malaysia.

Sphyraena barracuda (Edwards, 1771) オニカマス

JAPAN

SHIZUOKA PREF.

ZUMT 17758 (69.3 mm; Enoura, Numazu City; coll. by N. Kuroda)

OKINAWA PREF.

ZUMT 60286 (116.1 mm; estuary of Yonada River, Iriomote-jima Island, Ryukyu Archipelago; 20 Aug. 1989)

PHILIPPINES

ZUMT 14602 (157.5 mm; Philippines)

ZUMT 40988 (182.2 mm; Jolo Island; Feb. 1902; coll. by I. Iijima and K. Aoki)

ZUMT 42357 (269.4 mm; Basilan; 1926; coll. by U. Yamamura)

ZUMT 54648 (207.7 mm; Puerto Princesa, Palawan; 8 Feb. 1985; coll. by M. Aizawa)

PALAU

ZUMT ABE 2999 (379.4 mm), ZUMT ABE 3416 (172.6 mm), ZUMT ABE 3757 (301.0 mm), ZUMT ABE 3878 (321.0 mm; Palau)

Remarks: The Japanese collection site of the ZUMT specimen is shown in Fig. 2A.

Sphyraena forsteri Cuvier, 1829 オオメカマス

JAPAN

KAGOSHIMA PREF.

ZUMT 40728 (3 specimens, 75.7–85.8 mm; Amami-oshima Island, Amami Islands, Ryukyu Archipelago; coll. by K. Enokiya)

LOCALITY UNKNOWN

ZUMT 46390 (290.8 mm), ZUMT 46391 (284.5 mm; no data)

Remarks: The Japanese collection site of the ZUMT specimens is shown in Fig. 2A.

Sphyraena jello Cuvier, 1829 トラカマス

TAIWAN

ZUMT 14939 (233.1 mm), ZUMT 14940 (237.6 mm; Tainan; coll. by T. Aoki)

Sphyraena obtusata Cuvier, 1829 タイワンカマス

JAPAN

IZU ISLANDS

ZUMT ABE 62-118 (293.5 mm; off Ako, Miyake-jima Island, Izu Islands; 15 Oct. 1961; coll. by Y. Kurata)

KANAGAWA PREF.

ZUMT 48604 (277.4 mm; obtained at Misaki Market, Miura City; 21 Nov. 1955; coll. by I. Tomiyama)

RYUKYU ARCHIPELAGO

ZUMT 11265 (150.2 mm), ZUMT 15365 [144.2 mm; probably Okinawa-jima Island; coll. by S. Sakaguchi (Okinawa Prefectural Daiichi Junior High School)]

ZUMT 14283 (236.4 mm), ZUMT 14284 (229.0 mm), ZUMT 14285 (242.0 mm), ZUMT 14286 [236.2 mm; probably from Ryukyu Archipelago; 23 Jan. 1925; coll. by H. Yashiro (Naha Fish Market)]

ZUMT 14437 (239.0 mm), ZUMT 14466 (213.0 mm; Ryukyu Archipelago; coll. by S. Sakaguchi)

ZUMT 16917 (70.9 mm), ZUMT 20066 (70.3 mm; Onna Village, Okinawa Pref.; coll. by S. Sakaguchi)

ZUMT 16987 (129.4 mm), ZUMT 16989 (151.2 mm; Itoman City, Okinawa Pref.; coll. by S. Tanabe)

ZUMT 19081 (324.4 mm; probably collected from Okinawa Pref.; 18 May 1928; coll. by personnel of Okinawa Prefectural Experimental Center)

ZUMT 22765 (78.5 mm; Okinawa Pref.)

TAIWAN

ZUMT 13675 (96.4 mm; Keelung; coll. by T. Aoki)

ZUMT 62566 (145.5 mm; obtained at Ximending Market, Taipei City; 27 Mar. 1930)

PHILIPPINES

ZUMT 54649 (196.1 mm; Puerto Princesa, Palawan; 8 Feb. 1985; coll. by M. Aizawa)

PALAU

ZUMT 42740 (16 specimens, 86.6–162.7 mm; Palau; coll. by Y. Haneda)

ZUMT ABE 3825 (70.1 mm), ZUMT ABE 3827 (44.3 mm), ZUMT ABE 3828 (48.4 mm), ZUMT ABE 3829 (45.5 mm), ZUMT ABE 5911 (229.4 mm; Palau)

TANZANIA

ZUMT 52868 (149.6 mm; Kunduchi, Dar es Salaam)

LOCALITY UNKNOWN

ZUMT 46392 (268.3 mm), ZUMT 46393 (250.5 mm), ZUMT ABE 1746 (169.3 mm), ZUMT ABE 60-35 (182.5 mm; no data)

Remarks: Although *S. obtusata* is now abundantly caught off the Pacific coast of Japan from Wakayama Prefecture to Kyushu (Doiuchi 2001; Kagoshima City Aquarium Foundation 2008, 2018; Ikeda and Nakabo 2015; Hata et al. 2017; Hata 2018, 2020; Miki 2019a, 2021), ZUMT examples of the species from the above area are limited to single specimens collected from Sagami Bay and Miyake-jima Island in 1955 (ZUMT 48604) and 1961 (ZUMT ABE 62-118), respectively (Fig. 2B). This suggests that the frequent occurrence of *S. obtusata* in the area north of Kyushu is a recent phenomenon that began in the latter half of the 20th century. Additionally, *S. obtusata* is abundantly caught in Okinawa Prefecture (Yoshino 1984a; Taguchi 1989; Motonaga 1991; Miura 2012). The abundance of many specimens from the Ryukyu Archipelago in the ZUMT collection suggests that the species has been abundant in that region since the early 20th century.

Sphyræna pinguis Günther, 1874 アカカマス

JAPAN

HOKKAIDO

ZUMT 8255 (68.6 mm; Takashima, Otaru City; Sept. 1909; coll. by personnel of Hokkaido Prefectural Fisheries Experimental Station)

AOMORI PREF.

ZUMT 13242 (147.7 mm), ZUMT 13243 (166.0 mm; Hamasuka, Hachinohe City; 26 Oct. 1923; coll. by S. Tanabe)

ZUMT 34030 [162.0 mm; probably collected from Aomori Pref.; donated by S. Wada (Aomori Normal School)]

IBARAKI PREF.

ZUMT 14395 (204.3 mm; Kuji, Hitachi City)

CHIBA PREF.

ZUMT 27561 (73.0 mm), ZUMT 29419 (66.4 mm), ZUMT 29420 (77.5 mm), ZUMT 29423 (73.4 mm; Chiba Pref.)

TOKYO MARKET

ZUMT 4121 (182.7 mm), ZUMT 4122 (166.8 mm; obtained at Tokyo Market, Tokyo Met.)

KANAGAWA PREF.

ZUMT 3558 (174.9 mm), ZUMT 3559 (196.2 mm; Misaki, Miura City; 20 Sept. 1913; coll. by K. Aoki)

ZUMT 21281 (149.1 mm; Kanagawa Pref.; 20 Sept. 1925)

ZUMT 27402 (63.2 mm; Koajiro, Aburatsubo, Misaki, Miura City; 27 July 1904)

ZUMT 48605 (241.9 mm; obtained at Misaki Market, Miura City; 21 Nov. 1955)

ZUMT 55649 (278.0 mm; Misaki Market, Miura City, Kanagawa Pref.; 29 July 1986)

SHIZUOKA PREF.

ZUMT 18568 (124.1 mm; Hamana Lake; coll. by S. Oe)

ZUMT 43335 (57.4 mm; Shizuura, Numazu City)

HIROSHIMA PREF.

ZUMT 25289 (198.0 mm; obtained at Hiroshima Market; 4 Nov. 1932; coll. by M. Katayama)

YAMAGUCHI PREF.

ZUMT 33644 [89.1 mm; probably collected from Seto Inland Sea in Yamaguchi Pref.; donated by M. Eitomi (San-yo-onoda City)]

TOYAMA PREF.

ZUMT 32305 (44.6 mm), ZUMT 32306 (52.7 mm; Toyama Bay, Toyama Pref.; 28 Aug. 1935)

ZUMT 41219 (193.0 mm), ZUMT 41258 (197.5 mm), ZUMT 41259 (182.5 mm), ZUMT 41341 (168.0 mm; Uozu or Namerikawa City; coll. by I. Tomiyama)

ISHIKAWA PREF.

ZUMT 34180 (80.0 mm), ZUMT 34181 (83.8 mm; Shoin, Suzu City)

KYOTO PREF.

ZUMT 24330 (259.4 mm; Miyazu City; coll. by Kyoto Prefectural Training Center)

SHIMANE PREF.

ZUMT 31183 (103.3 mm; Matsue City)

ZUMT 31472 [282.2 mm; probably collected from Shimane Pref.; donated by R. Yanai (Matsue High School)]

EHIME PREF.

ZUMT 24975 (205.0 mm; Horie, Matsuyama City; Oct. 1931; coll. by S. Ishikawa)

FUKUOKA PREF.

ZUMT 35783 (155.8 mm), ZUMT 35784 (116.9 mm; Ariake Sea, off Okinohata, Yanagawa City; Oct. 1931; coll. by I. Tomiyama)

NAGASAKI PREF.

ZUMT 50071 [191.9 mm; Tamanoura, Goto City (Fukue-jima Island, Goto Islands); 14 Oct. 1953; coll. by I. Tomiyama]

ZUMT 50161 (198.0 mm), ZUMT 50162 (203.9 mm), ZUMT 50163 [178.3 mm; Arikawa, Shinkamigoto Town (Nakadori-jima Island, Goto Islands); 18 Oct. 1953; coll. by I. Tomiyama]

KAGOSHIMA PREF.

ZUMT 31628 (190.0 mm; Kagoshima Pref.)

CHINA

ZUMT 54507 (264.7 mm), ZUMT 54508 (252.5 mm), ZUMT 54509 (267.5 mm), ZUMT 54510 [262.3 mm; East China Sea, northeast of Shanghai (32°15'N, 122°40'E), 25 m depth; 11 Oct. 1984; coll. by FV *8th Ten-yo-maru*]

LOCALITY UNKNOWN

ZUMT 26741 (100.8 mm), ZUMT 46455 (158.5 mm), ZUMT 46876 (189.4 mm), ZUMT 46891 (184.3 mm), ZUMT 63314 (71.2 mm), ZUMT 63387 (173.3 mm), ZUMT 63388 (138.7 mm), ZUMT 63389 (153.7 mm), ZUMT 63390 (173.7 mm), ZUMT 63391 (145.2 mm), ZUMT 63392 (164.3 mm), ZUMT 63396 (152.2 mm), ZUMT 63397 (173.7 mm), ZUMT 63398 (145.5 mm), ZUMT 63399 (155.0 mm), ZUMT ABE 1920 (198.2 mm), ZUMT ABE 2669 (169.5 mm; no data)

Remarks: Although *S. pinguis* had been previously believed to be endemic to the northwestern Pacific (not distributed in the Ryukyu Archipelago) (Senou 1997a, 2002), Doiuchi and Nakabo (2005, 2007) showed that the species was widely distributed in the Indo-West Pacific; that a species previously treated as “Daruma-kamasu” (Yoshino 1984b; Senou 1997b, 2002) from the Ryukyu Archipelago was also identifiable as *S. pinguis*. Although examples of *S. pinguis* collected from Hokkaido to Kyushu were observed in the ZUMT collection, none from the Ryukyu Archipelago were found (Fig. 2B).

***Sphyraena putnamae* Jordan & Seale, 1905 オオカマス**

PHILIPPINES

ZUMT 12679 (323.7 mm; Philippines; coll. by U. Yamamura)

PALAU

ZUMT ABE 2759 (490.0 mm), ZUMT ABE 3826 (73.0 mm; Palau)

***Sphyraena genie* Klunzinger, 1870 タツカマス**

PHILIPPINES

ZUMT 42375 (360.3 mm; Basilan; 1926; coll. by U. Yamamura)

MALAYSIA

ZUMT 62661 (211.9 mm, probably Sarawak State; tagged as “P2368”)

ZUMT 62662 (222.3 mm; probably Sarawak State; tagged as “P1508”)

***Sphyraena stellata* Morishita & Motomura, 2020 ホソカマス**

JAPAN

OGASAWARA ISLANDS

ZUMT 63381 (363.9 mm), ZUMT 63382 (366.7 mm), ZUMT 63383 (373.6 mm; Ogasawara Islands; Mar. 1913; coll. by S. Fujimori)

KANAGAWA PREF.

ZUMT 48603 (319.8 mm; obtained at Misaki Fish Market, Miura City; 21 Nov. 1955; coll. by I. Tomiyama)

OKINAWA PREF.

ZUMT 11167 (166.4 mm), ZUMT 11168 [165.1 mm; probably Okinawa-jima Island, Ryukyu Archipelago; coll. by S. Sakaguchi (Okinawa Prefectural Daiichi Junior High School)]

ZUMT 16753 (228.6 mm), ZUMT 16754 (224.4 mm), ZUMT 16899 (190.2 mm), ZUMT 16900 (180.5 mm), ZUMT 16901 (178.0 mm), ZUMT 16904 (193.3 mm; Onna Village, Okinawa-jima Island; coll. by S. Tanabe)

ZUMT 16988 (141.6 mm; Itoman City, Okinawa-jima Island; coll. by S. Tanabe)

LOCALITY UNKNOWN

ZUMT 46527 (158.3 mm; no data)

Remarks: The Japanese collection sites of the ZUMT specimens are shown in Fig. 2A.

Sphyraena sp. ヤマトカマス

JAPAN**HOKKAIDO**

ZUMT 11328 (157.3 mm; Mombetsu, Date City; Oct. 1919; coll. by M. Tsuda)

CHIBA PREF.

ZUMT 2817 (130.3 mm) ZUMT 11816 (130.7 mm; Takanoshima, Tateyama City)
ZUMT 29418 (92.4 mm), ZUMT 29421 (82.3 mm), ZUMT 29422 (73.2 mm), ZUMT 29424
(79.4 mm), ZUMT 29425 (81.0 mm; Chiba Pref.)
ZUMT 33433 (148.8 mm), ZUMT 33436 (61.9 mm; Katsuura City)

TOKYO MARKET

ZUMT 21040 (89.8 mm; obtained at Tokyo Market)
ZUMT 63405 (194.0 mm) ZUMT 63406 (194.0 mm), ZUMT 63407 (199.9 mm), ZUMT
63408 (197.6 mm; probably obtained at Tokyo Fish Market)

IZU ISLANDS

ZUMT 62995 (5 specimens, 127.7–140.5 mm; Motomachi, Izu-oshima Island; 27 July 1991)

KANAGAWA PREF.

ZUMT 3560 (200.2 mm), ZUMT 3562 (195.7 mm), ZUMT 3563 (172.0 mm), ZUMT 4185
(127.7 mm; Misaki, Miura City; 20 Sept. 1913; coll. by K. Aoki)
ZUMT 20848 (160.4 mm), ZUMT 20867 (166.4 mm; Misaki, Miura City)
ZUMT 21255 (169.6 mm; Kanagawa Pref.; 20 Sept. 1925; coll. by personnel of Kamakura
Normal School)
ZUMT 26726 (51.2 mm; Aburatsubo, Misaki, Miura City; Oct. 1903)
ZUMT 27397 (87.8 mm), ZUMT 27400 (88.6 mm), ZUMT 27401 (92.8 mm; Koajiro, Misaki,
Miura City; 27 July 1904; coll. by S. Tanaka)

SHIZUOKA PREF.

ZUMT 3247 (251.8 mm; Hamana Lake; coll. by T. Aoki)
ZUMT 16272 (75.7 mm), ZUMT 16273 (70.1 mm), ZUMT 16274 [74.1 mm; probably
collected from Shizuoka Pref.; coll. by T. Yoneyama (Shizuoka Prefectural
Izushimodaminami Girls' High School)]
ZUMT 33354 (84.3 mm), ZUMT 33355 (96.8 mm; Shizuoka Pref.)

MIE PREF.

ZUMT 23128 (115.0 mm; Kada Bay, Owase City; 1 Aug. 1922; coll. by Y. Tsuchiga)
ZUMT 23129 (72.8 mm), ZUMT 23130 (72.1 mm), ZUMT 23131 (78.0 mm; Kimoto,
Kumano City; 4 May 1929; coll. by Y. Tsuchiga)

WAKAYAMA PREF.

ZUMT 21985 (149.3 mm; Wakayama Pref.; Jan. 1920)

HYOGO PREF.

ZUMT 2223 (84.0 mm; Fukura, Awaji City, Awaji-shima Island; coll. by R. Uchiyama)

SHIMANE PREF.

ZUMT 31173 (190.0 mm), ZUMT 31271 (202.0 mm; Matsue City)

EHIME PREF.

ZUMT 7146 (135.5 mm; pearl farm in Uchiumi, Ainan Town; 3 July 1916; coll. by K. Otsuki)

KOCHI PREF.

ZUMT 34601 (66.1 mm), ZUMT 34602 (64.5 mm; Kochi Pref.)

FUKUOKA FISH MARKET

ZUMT 51843 (122.8 mm), ZUMT 51844 (116.1 mm), ZUMT 51845 (115.2 mm), ZUMT 51846 (114.6 mm), ZUMT 51847 (107.0 mm; obtained at Fukuoka Fish Market, Fukuoka Pref.; 1959)

NAGASAKI PREF.

ZUMT 2296 (124.1 mm; Nagasaki Pref.; 27 June 1909)

ZUMT 27103 (62.3 mm), ZUMT 43314 (45.4 mm), ZUMT 44483 (6 specimens, 47.1–51.7 mm; Nagasaki Pref.)

ZUMT 47868 [240.0 mm; Tamanoura, Goto City (Fukue-jima Island, Goto Islands); 23 May 1953; coll. by I. Tomiyama]

ZUMT 48124 (244.1 mm), ZUMT 48125 [237.6 mm; Fukue Fish Market, Fukue, Goto City (Fukue-jima Island, Goto Islands); May 1953; coll. by I. Tomiyama]

ZUMT 50030 [256.4 mm; Miiraku, Goto City (Fukue-jima Island, Goto Islands); 13 Oct. 1953; coll. by I. Tomiyama]

ZUMT 50164 [197.8 mm; Arikawa, Shinkamigoto Town (Nakadori-jima Island, Goto Islands); 17 Oct. 1953; coll. by I. Tomiyama]

KAGOSHIMA PREF.

ZUMT 23747 (208.8 mm; Taniyama, Kagoshima City; 20 July 1930)

TAIWAN

ZUMT 13674 (162.5 mm; Keelung; coll. by T. Aoki)

LOCALITY UNKNOWN

ZUMT 63400 (186.2 mm), ZUMT ABE 2262 (80.3 mm), ZUMT ABE 2371 (93.4 mm), ZUMT ABE 2411 (108.7 mm), ZUMT ABE 2412 (84.5 mm), ZUMT ABE 2413 (103.1 mm), ZUMT ABE 2414 (83.6 mm), ZUMT ABE 2668 (190.0 mm), ZUMT ABE 60-36 (56.6 mm; no data)

Remarks: Although the applied name for the species treated as “ヤマトカマス” is frequently regarded as *Sphyraena japonica* Bloch & Schneider, 1801 (e.g., Senou 2013; Chiang et al. 2014; Jeong 2017; Hata 2018; Miki 2019b), it is treated as *Sphyraena* sp. herein, due to its questionable taxonomic status (Motomura 2020). Specimens in ZUMT represented a broad distribution in Japanese waters, from Hokkaido to Kyushu (Fig. 2C).

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References

- Abdussamad, E. M., Rethesh, T. B., Thangaraja, R., Bineesh, K. K. and Prakasan, D. 2015. *Sphyraena arabiansis* a new species of barracuda (family: Sphyraenidae) from the south-west coast of India. *Indian Journal of Fisheries*, 62 (2): 1–6.
- Ballen, G. A. 2019. Nomenclature of the Sphyraenidae (Teleostei: Carangaria): a synopsis of fossil- and extant-based classification systems. *Zootaxa*, 4686 (3): 397–408.
- Chiang, W.-C., Lin, P.-L., Chen, W.-Y. and Liu, D.-C. 2014. Marine fishes in eastern Taiwan. Fisheries Research Institute, Council of Agriculture, Keelung. vii + 331 pp. (In Chinese)
- DeLuca, L. P. 2014. Warning! Barracudas may bite: third circuit puts “teeth” in the FTCA’s discretionary function exception analysis. 58: 773–796.
- de Silva, D. P. 1963. Systematics and life history of the Great Barracuda *Sphyraena barracuda* (Walbaum). University of Miami Press, Miami. viii + 179 pp.
- Doiuchi, R. 2001. *Sphyraena flavicauda* Rüppell. P. 255. In: Nakabo, T., Machida, Y., Yamaoka, K. and Doiuchi, R. (eds) *Iburi, Fishes of Kuroshio*. Osaka Kaiyukan, Osaka. (In Japanese)
- Doiuchi, R. and Nakabo, T. 2005. The *Sphyraena obtusata* group (Perciformes: Sphyraenidae) with a description of a new species from southern Japan. *Ichthyological Research*, 52 (2): 132–151.
- Doiuchi, R. and Nakabo, T. 2007. Molecular evidence for the taxonomic status of three species of the *Sphyraena obtusata* group (Perciformes: Sphyraenidae) from East Asia. *Ichthyological Research*, 54 (3): 313–316.
- Geller, R. J., Olson, K. R. and Sénécal, P. E. 1991. Ciguatera fish poisoning in San Francisco, California, caused by imported barracuda. *The Western Journal of Medicine*, 155 (6): 639–642.
- Girard, M. G., Davis, M. P. and Smith, W. L. 2020. The phylogeny of carangiform fishes: morphological and genomic investigations of a new fish clade. *Copeia*, 108 (2): 265–298.
- Gosline, W. A. 1971. Functional morphology and classification of teleostean fishes. University of Hawaii Press, Honolulu. 208 pp.
- Hashimoto, Y. 1956. A note on the poison of a barracuda, *Sphyraena picuda* Bloch & Schneider. *Bulletin of the Japanese Society of Scientific Fisheries*, 21 (11): 1153–1157.
- Hata, H. 2018. Sphyraenidae. Pp. 418–422. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) *Field guide to fishes landed at Uchinoura Fishing Port, Kagoshima, Japan*. The Kagoshima University Museum, Kagoshima. (In Japanese)

- Hata, H. 2020. Sphyraenidae. Pp. 492–502. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) Fishes from markets in Osumi Peninsula, Kagoshima, Japan. The Kagoshima University Museum, Kagoshima. (In Japanese)
- Hata, H., Iwatsubo, H., Yamada, M., Maekawa, T. and Motomura, H. 2017. First records of *Sphyraena iburiensis* (Perciformes: Sphyraenidae) from the Amami Islands and southern Kyushu, Japan. *Biogeography*, 19: 10–16.
- Ikeda, H. and Nakabo, T. 2015. Fishes of the Pacific coasts of southern Japan. Tokai University Press, Hadano, 597 pp. (In Japanese)
- Jeong, B. 2017. Sphyraenidae. Pp. 257–259. In: Iwatsubo, H. and Motoura, H. (eds) Field guide to fishes of Kagoshima Bay in southern Kyushu, Japan. Kagoshima Museum of Aquatic Biodiversity, Kagoshima and the Kagoshima University Museum, Kagoshima. (In Japanese)
- Jordan, D. S. and Hubbs, C. L. 1909. Studies in Ichthyology. A monographic review of the family of Atherinidae or silversides. Leland Stanford Junior University Publications University Series. 87 pp., 12 pls.
- Kagoshima City Aquarium Foundation. 2008. Fishes collected with set net confirmed by Kagoshima city aquarium in Kagoshima. Kagoshima City Aquarium Foundation, Kagoshima, 224 pp. (In Japanese)
- Kagoshima City Aquarium Foundation. 2018. Fishes collected with set nets in Kagoshima and confirmed by Kagoshima City Aquarium. Second edition. Kagoshima City Aquarium Foundation, Kagoshima, 335 pp. (In Japanese)
- Koeda, K., Hata, H., Aizawa, M., Sakamoto, K. and Ueshima, R. 2022. History of the fish collection of the Department of Zoology, The University Museum, The University of Tokyo. The University Museum, The University of Tokyo Material Reports, 129: 1–24. (In Japanese)
- Matta, J., Milad, M., Manger, R. and Tosteson, T. 1999. Heavy metals, lipid peroxidation, and ciguatera toxicity in the liver of the Caribbean barracuda (*Sphyraena barracuda*). *Biological Trace Element Research*, 70: 69–79.
- Matsubara, K. 1955. Fish Morphology and Hierarchy. Parts I–III. Ishizaki Shoten, Tokyo. xi + 1605pp., 135 pls. (In Japanese)
- Miki, R. 2019a. Sphyraenidae. Pp. 176–181. In: Murase, A., Miki, R., Wada, M. and Senou, H. (eds) Coastal and market fishes around Kadogawa Bay, northern part of Miyazaki Prefecture, southern Japan. Nobeoka Marine Science Station, Field Science Center, University of Miyazaki, Nobeoka. (In Japanese)
- Miki, R. 2019b. Sphyraenidae. Pp. 1151–1155. In: Koeda, K. and Ho, H.-C. (eds) Fishes of southern Taiwan. National Museum of Marine Biology & Aquarium, Pingtung, Taiwan.
- Miki, R. 2021. Sphyraenidae. Pp. 224–229. In: Murase, A., Ogata, Y., Yamasaki, Y., Miki, R., Wada, M. and Senou, H. (eds) Coastal, shelf and deep-sea fishes around Kadogawa Bay, northern part of Miyazaki Prefecture, southern Japan. Nobeoka Marine Science Station, Field Science Center, University of Miyazaki, Nobeoka. (In Japanese)
- Ministry of Health and Welfare, 1953. About “poisonous barracuda”. *Eikanhatsu*, 20: 21. (In Japanese)

- Mirande, J. M. 2016. Combined phylogeny of ray-finned fishes (Actinopterygii) and the use of morphological characters in large-scale analyses. *Cladistics*, 33: 333–350.
- Miura, N. 2012. Fishes at Chinen Market, Okinawa. Wave Kikaku, Yonabaru. 140 pp. (In Japanese)
- Morishita, S., Miki, R., Wada, H., Itou, M. and Motomura, H. 2020a. Morphological comparisons of *Sphyraena qenie* with *S. putnamae*, with a revised key to Indo-Pacific species of *Sphyraena* lacking gill rakers (Sphyraenidae). *Ichthyological Research*, 67: 456–463. Doi: 10.1007/s10228-020-00738-6
- Morishita, S., Miki, R., Senou, H. and Motomura, H. 2020b. First Pacific records of *Sphyraena arabiansis* (Perciformes: Sphyraenidae), with a revised species diagnosis and morphological comparisons with *S. barracuda*. *Japanese Journal of Ichthyology*, 67(1): 73–83. Doi: 10.11369/jji.19-051 (In Japanese)
- Morishita, S. and Motomura, H. 2020. *Sphyraena stellata*, a new barracuda from the Indo-Pacific, with redescription of *S. helleri* Jenkins, 1901 and *S. novaehollandiae* Günther, 1860 (Perciformes: Sphyraenidae). *Zootaxa*, 4772 (3): 545–566. DOI: 10.11646/zootaxa.4772.3.6
- Motomura, H. 2020. List of Japan's all fish species. Current standard Japanese and scientific names of all fish species recorded from Japanese waters. The Kagoshima University Museum, Kagoshima. 560 pp. (In Japanese)
- Motonaga, F. 1991. Set net fishing resources surveys in Okinawa-jima Island. Pp. 94–102. In: Okinawa Prefectural Fisheries Experimental Station (ed), 1989 Okinawa Prefectural Fisheries Experimental Station Report. Okinawa Prefectural Fisheries Experimental Station, Naha. (In Japanese)
- Noguchi, T. 2004. Food poisoning due to marine toxin different from before. *Frozen Foods Technical Research*, 62: 1–10. (In Japanese)
- Rabosky, D. L., Chang, J., Title, P. O., Cowman, P. F., Sallan, L., Friedman, M., Kaschner, K., Garilao, C., Near, T. J., Coll, M. and Alfaro, M. E. 2018. An inverse latitudinal gradient in speciation rate for marine fishes. *Nature*, 559: 392–395.
- Russell, B. C. 2002. Sphyraenidae, barracudas. Pp. 1807–1811. In: Carpenter, K. E. (ed), *FAO species identification guide for fishery purposes and American Society of Ichthyologists and Herpetologists Special Publication no. 5. The living marine resources of the western central Atlantic. Vol. 3. Bony fishes part 2 (Opisthognathidae to Molidae), sea turtles and marine mammals*. FAO, Rome.
- Russell, B. C. 2016. Sphyraenidae, barracudas. Pp. 2865–2872 In: Carpenter, K. E. and De Angelis, N. (eds) *FAO species identification guide for fishery purposes. The living marine resources of the eastern central Atlantic. Vol. 4. Bony fishes part 2 (Perciformes to Tetraodontiformes)*. FAO, Rome.
- Senou, H. 1997a. *Sphyraena pinguis*. P. 654. In: Okamura, O. and Amaoka, K. (eds) *Sea fishes of Japan*. Yama-kei Publishers, Tokyo. (In Japanese)
- Senou, H. 1997b. *Sphyraena obtusata*. P. 655. In: Okamura, O. and Amaoka, K. (eds) *Sea fishes of Japan*. Yama-kei Publishers, Tokyo. (In Japanese)
- Senou, H. 2001. Sphyraeniadae, barracudas. Pp. 3685–3697. In: Carpenter, K. E. and Niem, V. H. (eds) *FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific, vol. 6, no. 4*. FAO, Rome.

- Senou, H. 2002. Sphyraenidae, barracudas. Pp. 1334–1337, 1623–1624. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species, English edition. Tokai University, Press, Tokyo.
- Senou, H. 2013. Sphyraenidae, barracudas. Pp. 1636–1639, 2219–2221. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species third edition. Tokai University, Press, Hadano. (In Japanese)
- Taguchi, T. 1989. Field guide vol. 2, sea fishes of Japan. Shogakukan, Tokyo. 259 pp. (In Japanese)
- Yoshino, T. 1984a. *Sphyraena flavicauda* Rüppell. P. 118, pl. 106-E. In: Masuda, H., Amaoka, K., Araga, C., Uyeno, T., and Yoshino, T. (eds) The fishes of the Japanese Archipelago. Tokai University Press, Tokyo. (In Japanese)
- Yoshino, T. 1984b. *Sphyraena obtusata* Cuvier. P. 118, pl. 106-F. In: Masuda, H., Amaoka, K., Araga, C., Uyeno, T., and Yoshino, T. (eds) The fishes of the Japanese Archipelago. Tokai University Press, Tokyo. (In Japanese)



Figure 1. Preserved specimen of *Sphyraena arabiansis*, ZUMT 62660, 289.0 mm, probably Sarawak State.

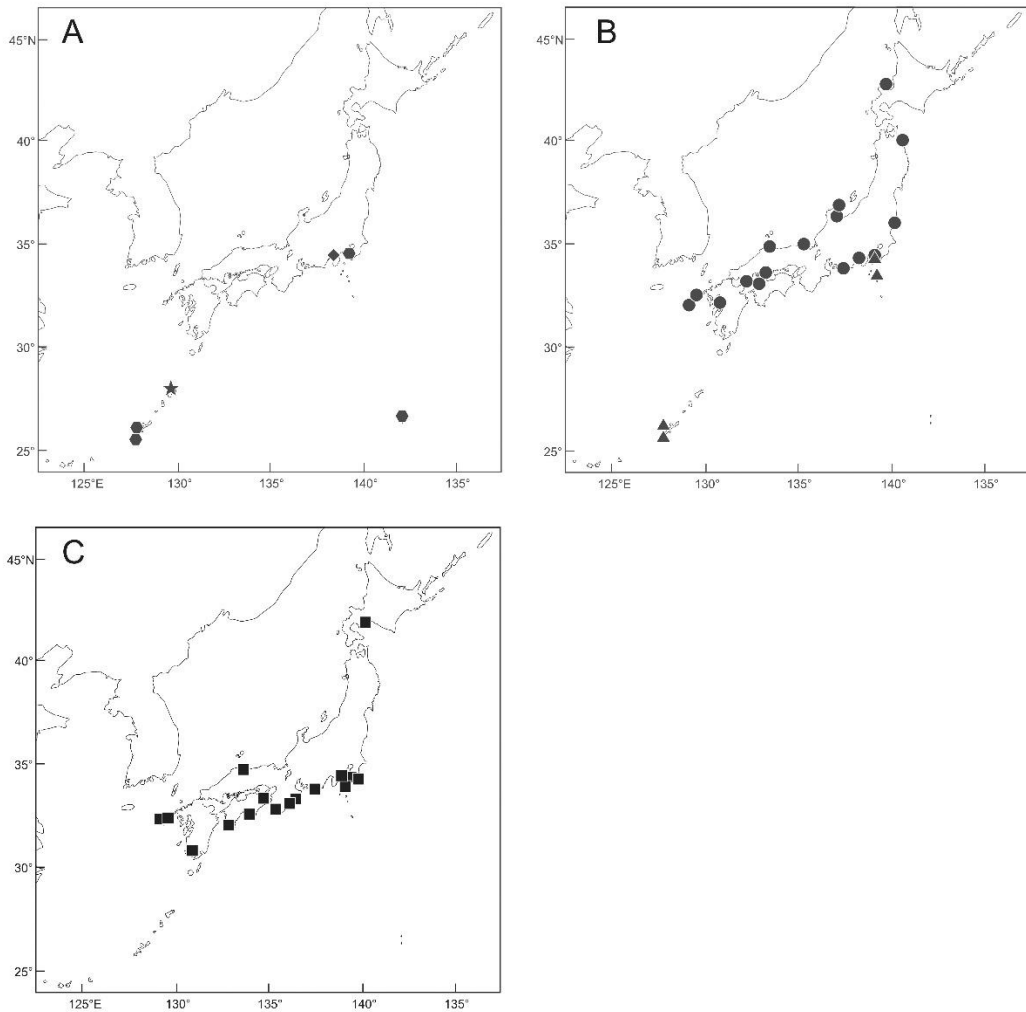


Figure 2. Japanese collection localities of specimens of (A) *Sphyraena barracuda* (diamond), *S. forsteri* (star), and *S. stellata* (hexagons), (B) *Sphyraena obtusata* (triangles) and *S. pinguis* (circles), and (C) *Sphyraena* sp. “Yamato-kamasu” (squares) deposited in ZUMT collection.