

## XIPHIIDAE

## Swordfish

by I. Nakamura (after Collette, 1978), Fisheries Research Station, Kyoto University, Japan

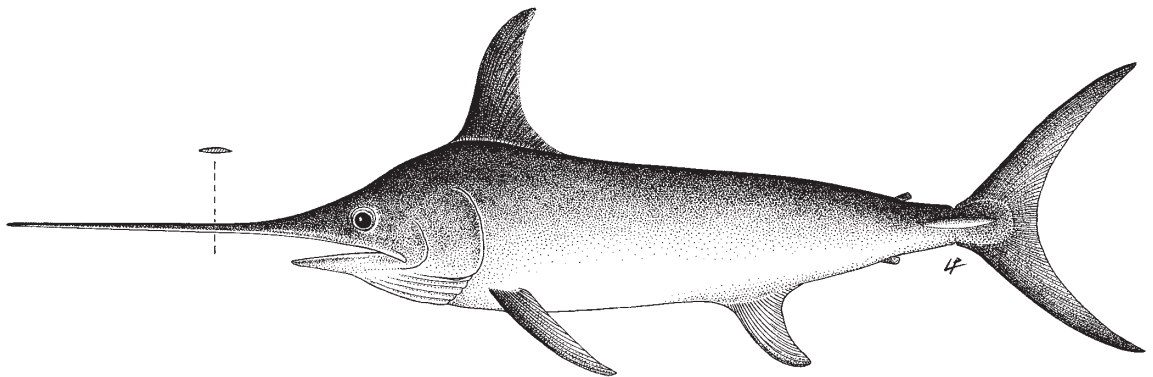
**A single species in this family.**

*Xiphias gladius* Linnaeus, 1758

SWO

**Frequent synonyms / misidentifications:** None / None.

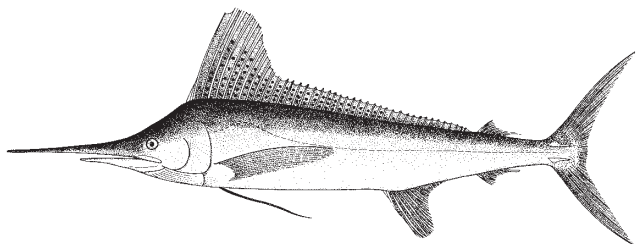
**FAO names:** En - Swordfish; Fr - Espadon; Sp - Pez espada.



**Diagnostic characters:** A large fish of rounded body in cross-section, very robust in front; **snout ending in a long, flattened, sword-like structure**; gill rakers absent, gill filaments reticulated. Dorsal and anal fins each consisting of 2 widely separated portions in adults, but both fins continuous and single in young and juveniles; **pelvic fins absent**; caudal fin lunate and strong in adults, emarginate to forked in young. **A single, strong, lateral keel on each side of caudal peduncle. A deep notch each dorsally and ventrally just in front of base of caudal fin. Scales absent in adults** but peculiar scale-like structures present in young, gradually disappearing with growth. Lateral line exists in young and juveniles, but disappearing with growth. **Colour:** back and upper sides brownish black, lower sides and belly light brown.

#### Similar species occurring in the area

Istiophoridae (*Tetrapturus* and *Makaira* species): snout also prolonged into a bill, but rounded in cross-section, not flattened; pelvic fins present, long, narrow and rigid; 2 keels on each side of caudal peduncle. A shallow notch each dorsally and ventrally in front of base of caudal fin. Lateral line always exists.

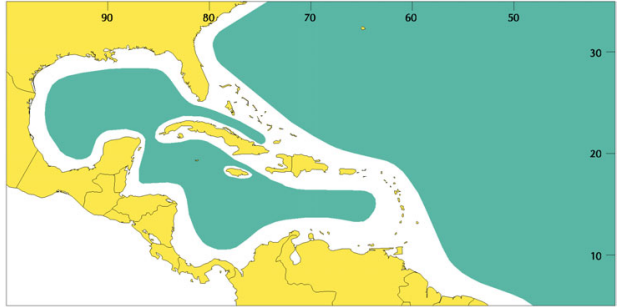


Istiophoridae

**Size:** Maximum to 4.5 m; common to 2.2 m.

**Habitat, biology, and fisheries:** A highly migratory and aggressive fish, adult fish generally not forming large schools; found in offshore waters and oceanic waters. Feeds on a wide range of fishes, especially schooling species; also on pelagic crustaceans and the most favorite pelagic squids. It is reported to use its sword to hit and kill larger prey. In surface waters at night, and moderately deeper waters during the day throughout its range. FAO statistics report landings ranging from 1 703 to 3 371 t from 1995 to 1999. Caught mainly with harpoons and floating longlines; also by trolling for sportsfishing. Marketed fresh and frozen. Meat is highly appreciated for being tender and delicious, and is used for steaks and teriyaki. Large individuals sometimes develop high concentrations of mercury in their flesh.

**Distribution:** Worldwide in tropical and temperate waters; found throughout the area; northward to Nova Scotia, southward to Argentina in the Atlantic Ocean.



## Reference

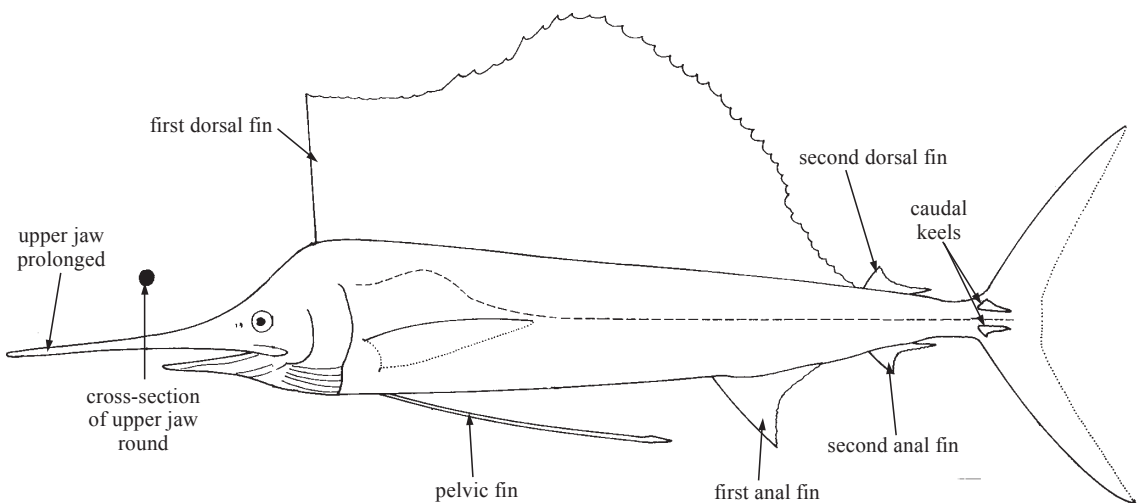
Nakamura, I. 1985. FAO species catalogue. Vol. 5. Billfishes of the world. An annotated and illustrated catalogue of marlins, sailfishes, spearfishes and swordfishes known to date. *FAO Fish. Synop.*, 5(125):1-65.

## ISTIOPHORIDAE

### Billfishes (spearfishes, marlins, and sailfishes)

by I. Nakamura, Fisheries Research Station, Kyoto University, Japan

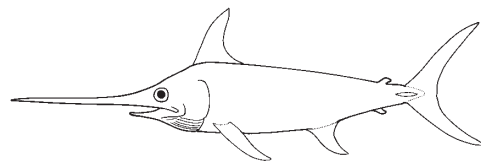
**Diagnostic characters:** Body elongate and more or less compressed. **Upper jaw prolonged into a long spear which is round in cross-section.** Mouth not protrusible, with fine, rasp-like teeth on both jaws; gill openings wide, left and right gill membrane united but free from isthmus; no rakers on gill arches, gill filaments reticulated. Two dorsal fins close together, the first much larger than the second; also 2 anal fins, the second much smaller than the first and similar in size and shape to second dorsal fin; first dorsal and first anal fins can both fold back into grooves; caudal fin large, strong, and forked, with **a pair of keels on either side at base.** **Upper keel slightly larger than lower keel.** **A shallow notch on both upper and lower sides of caudal peduncle.** Pectoral fins strong and falcate; pelvic fins consisting of 3 soft rays united with a spine. Lateral line always well visible except in large specimens of *Makaira nigricans*. Body covered with more or less imbedded, narrow, and well-ossified pointed scales. Vertebrae 24. **Colour:** back and upper sides dark blue, lower sides and belly silvery white. In some species there are horizontally aligned spots or longitudinal lines on body and/or black spots on the first dorsal-fin membrane.



**Habitat, biology, and fisheries:** Billfishes are primarily inhabitants of warm seas, usually the upper layers of water above the thermocline, but during the summer months they follow schools of smaller fishes to catch and eat into temperate and sometimes even colder areas. Being among the largest and swiftest teleost fishes of the oceans, they perform considerable, sometimes transoceanic, migrations. All billfishes are of some commercial value (high commercial value in Japanese markets) and provide excellent food. Most of the species are exploited commercially by surface long line and set net, and all are regarded as excellent game fish by sportsfishermen. The total reported catch of billfishes from Area 31 in 1997 was 1 930 t (commercial fisheries only).

### Similar families occurring in the area

**Xiphiidae:** upper jaw prolonged like in the billfishes, but shaped as a long sword rather than a spear, its cross-section flat-oval (round in Istiophoridae); pelvic fins absent; a single large keel on either side of caudal-fin base (2 keels in Istiophoridae); a deep notch on both the upper and lower profiles of caudal peduncle (shallower notch in Istiophoridae).



**Xiphiidae**

Alepisauridae: somewhat similar to sailfishes (species of *Istiophorus*) in general appearance; but easily distinguished by their jelly-like body; the absence of prolonged jaws, of keels at base of caudal fin, and of scales on body; the presence of fang-like teeth and an adipose fin situated post-dorsally (instead of a rayed second dorsal fin); and the insertion of pelvic fins far behind pectoral fins.



Alepisauridae

Belonidae: large representatives may be somewhat similar to small spearfishes or marlins (species of *Tetrapturus* or *Makaira*), but they have both jaws prolonged, dorsal and anal fins single and similar in size and shape, pectoral fins not falcate (except in *Ablennes*), and pelvic fins inserted far behind pectorals.



Belonidae

Key to the species of Istiophoridae occurring in the area

- 1a. First dorsal fin sail-like, considerably higher than body depth at level of midbody; pelvic-fin rays very long (almost reaching to anus), with a well-developed membrane (Fig. 1)  
..... *Istiophorus albicans*
- 1b. First dorsal fin not sail-like, slightly higher to lower than body depth at level of midbody; pelvic fins not as long (far from reaching to anus), with a moderately-developed membrane  
..... → 2

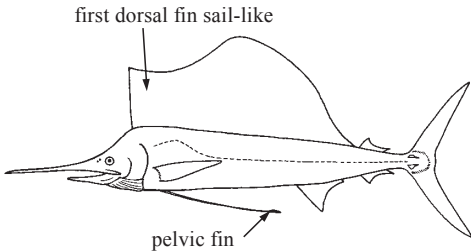


Fig. 1 *Istiophorus albicans*

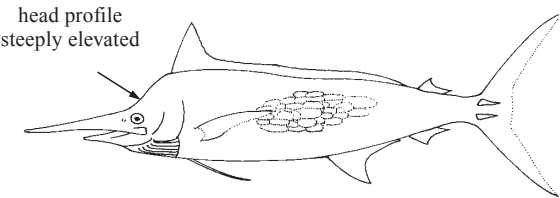
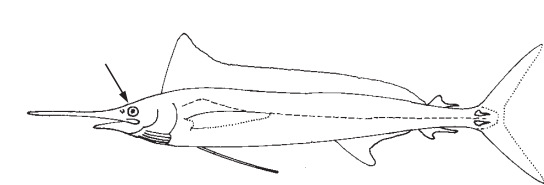


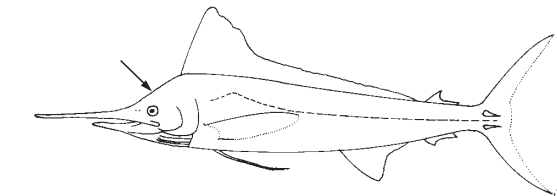
Fig. 2 *Makaira nigricans*

- 2a. Lateral line not straight, usually not visible in adults, characteristically a chicken wire-like pattern; anterior part of dorsal fin lower than body depth; profile of head between preorbital region and origin of first dorsal fin steeply elevated (Fig. 2) body not strongly compressed  
..... *Makaira nigricans*
- 2b. Lateral line visible, a simple straight line; anterior part of first dorsal fin slightly higher than, or nearly equal to, body depth; profile of head between preorbital region and origin of first dorsal fin nearly flat to slightly elevated; body strongly compressed ..... (*Tetrapturus*) → 3

- 3a.** Profile of head between preorbital region and origin of first dorsal fin nearly flat; anterior part of dorsal fin nearly equal to body depth; pectoral-fin length nearly equal to pelvic-fin length (Fig.3) . . . . . *Tetrapturus pfluegeri*
- 3b.** Profile of head between preorbital region and origin of first dorsal fin slightly elevated; anterior part of dorsal fin slightly higher than body depth; pectoral fin longer than pelvic fin (Fig. 4) . . . . . *Tetrapturus albidus*



**Fig. 3** *Tetrapturus pfluegeri*



**Fig. 4** *Tetrapturus albidus*

**List of species occurring in the area**

The symbol  is given when species accounts are included.

-  *Istiophorus albicans* (Latreille, 1804).
-  *Makaira nigricans* Lacepède, 1802.
-  *Tetrapturus albidus* Poey, 1860.
-  *Tetrapturus pfluegeri* Robins and de Sylva, 1963.

**Reference**

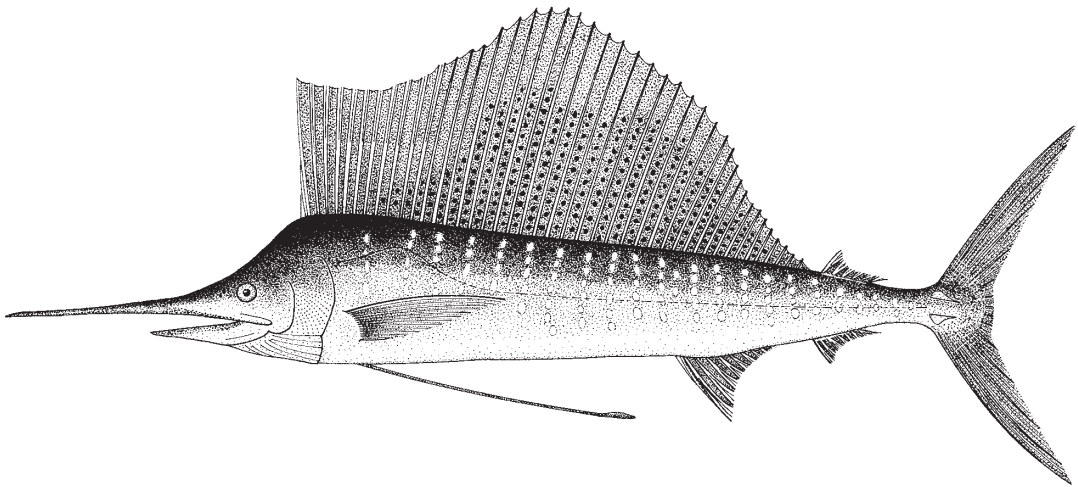
Nakamura, I. 1985. FAO Species catalogue. Vol. 5. Billfishes of the world. An annotated and illustrated catalogue of marlins, sailfishes, spearfishes and swordfishes known to date. *FAO Fish. Synop.*, 5(125):1-65.

***Istiophorus albicans*** (Latreille, 1804)

SAI

**Frequent synonyms / misidentifications:** *Histiophorus albicans* (Latreille, 1804); *Histiophorus americanus* Cuvier, 1832; *Istiophorus americanus* (Cuvier, 1832); *Istiophorus platypterus* (Shaw and Nodder, 1791) / None.

**FAO names :** **En** - Atlantic sailfish; **Fr** - Voilier de l'Atlantique; **Sp** - Pez vela del Atlántico.



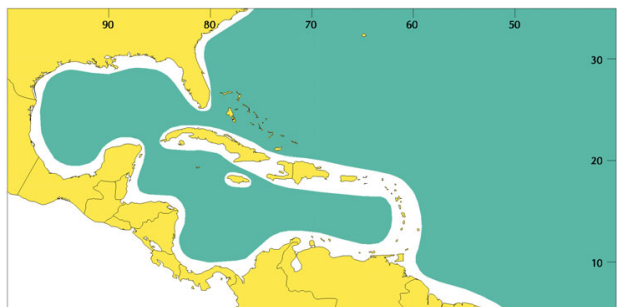
**Diagnostic characters:** Body elongate, much compressed. Upper jaw prolonged into a rather slender spear with round cross-section. Two dorsal fins, **the first large, sail-like, considerably higher than body depth throughout most of its length**, with 42 to 47 soft rays, the second small, with 6 or 7 soft rays; 2 separated anal fins, with 11 to 15 spines (first) and 6 or 7 soft rays (second); pectoral fins falcate with 17 to 20 soft rays; **pelvic fins very long, almost reaching to anus** and consisting of 1 spine and 3 soft rays. **Pectoral fins and caudal fin of young longer than those of Indo-Pacific sailfish.** Lateral line visible, curved above pectoral fin, then almost straight to tail. Body covered with rather sparsely imbedded scales with a blunt point. Vertebrae 24 (12 + 12). Anus close to origin of first anal fin. **Colour:** body dark blue dorsally, brown-blue laterally, silvery white ventrally; first dorsal-fin membrane blue-black, covered with many small black spots; other fins brown-black; about 20 vertical bars consisting of several small pale blue spots on sides of body.

**Size:** Maximum to about 3 m; common to 2.5 m.

**Habitat, biology, and fisheries:** Coastal and oceanic, rather highly migratory, usually found above the thermocline. Feeds on a wide variety of fishes, crustaceans, and cephalopods. Good sportsfishing grounds in the Caribbean Sea and the Gulf of Mexico; commercial surface longline fishing grounds near shore throughout the Atlantic Ocean. FAO statistics report landings ranging from 424 to 598 t from 1995 to 1999. Cuba, Taiwan Province of China, Venezuela, North Korea, and Russia also fish some of this species. Caught mainly with longlines (commercial fishing boats) and by trolling (sportsfishermen). Marketed mostly frozen; prepared as sashimi (sliced raw fish) and fish cakes in Japan.

**Distribution:** Throughout tropical and subtropical (sometimes temperate) waters of the Atlantic Ocean, straying northward to the Gulf of Maine and England. Densely distributed in the Caribbean Sea, the Gulf of Mexico, and coastal waters close to coasts and islands, waters of South America in the area.

**Remarks:** Often listed as *Istiophorus platypterus* (Shaw and Nodder, 1791). The phenotype shows some differences between the Indo-Pacific form and the Atlantic form, although mtDNA data indicate that both are the same. I prefer to follow the traditional usage of scientific names for both forms separately.

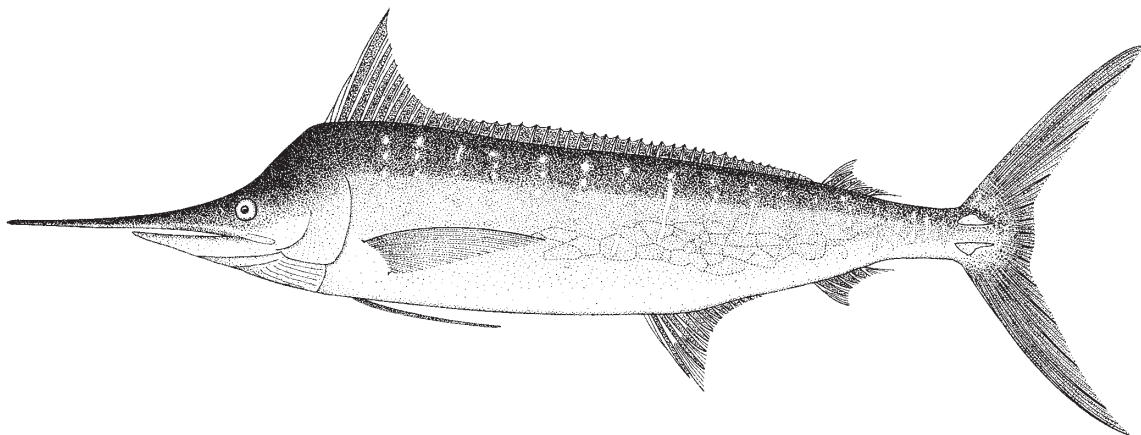


***Makaira nigricans* Lacepède, 1802**

BUM

**Frequent synonyms / misidentifications:** *Makaira ampla* (Poey, 1860) / None.

**FAO names:** En - Blue marlin; Fr - Makaire bleu; Sp - Aguja azul.

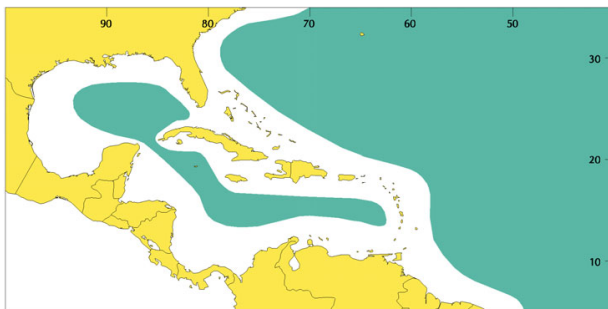


**Diagnostic characters:** Body elongate, not strongly compressed. Upper jaw prolonged into a stout spear with round cross-section; **head profile between preorbital region and origin of first dorsal fin very steep**. Two dorsal fins, the first (41 to 43 soft rays) long and low posteriorly, the second small with 6 or 7 soft rays; **height of anterior part of first dorsal fin smaller than body depth**; 2 separated anal fins with 13 to 15 spines (first) and 6 or 7 soft rays (second); pectoral fin falcate with 18 to 21 soft rays; pelvic fins shorter than pectoral fins, consisting of 1 spine and 3 soft rays. **Lateral line system reticulated, hard to see in large specimens**. Body covered with densely imbedded, well-ossified scales ending in 1 or 2 long acute spines. Anus close to origin of first anal fin. Vertebrae 24 (11 + 13). **Colour:** body dark blue to chocolate brown dorsally, silvery white ventrally; first dorsal-fin membrane blue-black, usually unspotted; other fins brown-black; several vertical bars consisting of pale blue spots on body.

**Size:** Maximum to about 4 m; common to 3.5 m.

**Habitat, biology, and fisheries:** Oceanic, highly migratory, usually found above the thermocline. Feeds on a wide variety of fishes, crustaceans, and cephalopods. Good sportsfishing grounds off Florida, in the Gulf of Mexico, and in the Caribbean Sea, and commercial fishing grounds in the Caribbean Sea and the Brazil Current. FAO statistics report landings ranging from 374 to 500 t from 1995 to 1999. Caught mainly with surface longlines (commercial fishing boats) and by trolling (sportsfishermen). Marketed mostly frozen.

**Distribution:** Throughout tropical and subtropical (sometimes temperate) waters of the Atlantic Ocean, straying northward at least to the Gulf of Maine. Densely distributed in the Gulf of Mexico, the Caribbean Sea, and in the Brazil Current.

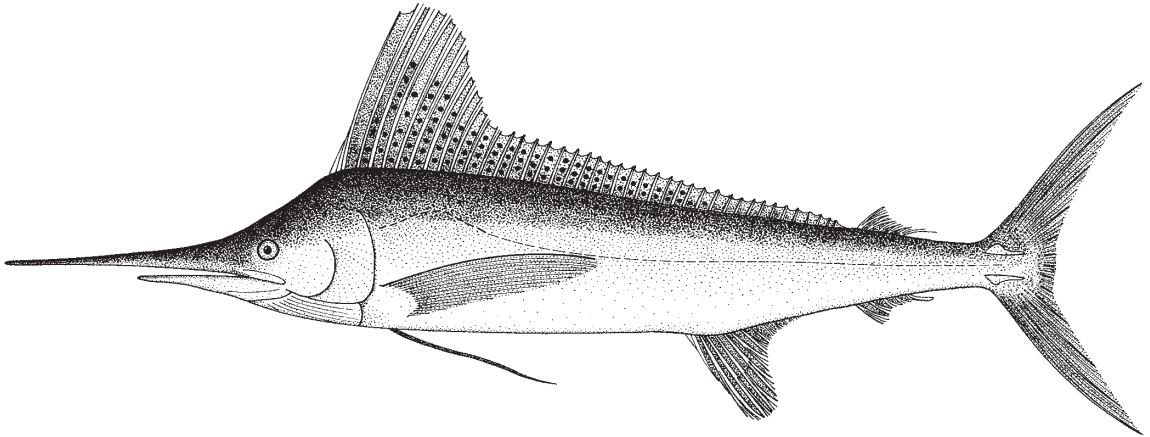


***Tetrapturus albidus* Poey, 1860**

WHM

**Frequent synonyms / misidentifications:** *Makaira albida* (Poey, 1860); *Lamontella albida* (Poey, 1860) / None.

**FAO names:** **En** - Atlantic white marlin; **Fr** - Makaire blanc de l'Atlantique; **Sp** - Aguja blanca del Atlántico.

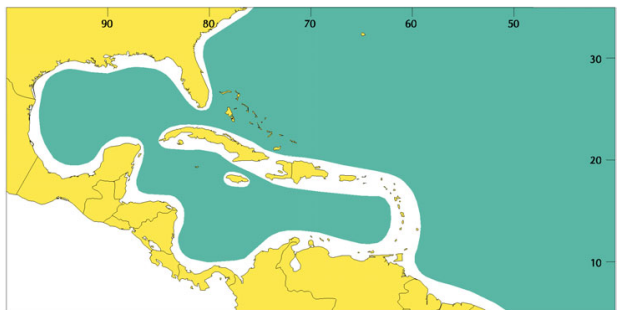


**Diagnostic characters:** Body elongate, compressed. Upper jaw prolonged into a spear with round cross-section. Two dorsal fins, the first (38 to 46 soft rays) long and low posteriorly, the second small with 5 or 6 soft rays; height of anterior part of first dorsal fin nearly equal to body depth; 2 separated anal fins with 12 to 17 spines (first) and 5 or 6 soft rays (second) respectively; pectoral fins falcate with 18 to 21 soft rays; pelvic fins nearly equal to pectoral fins in length, consisting of 1 spine and 3 soft rays; **tips of first dorsal, first anal, and pectoral fins rounded**. Lateral line visible, curved above pectoral fin, then almost straight to tail. Body covered with densely imbedded scales ending in a single acute point. Anus close to origin of first anal fin. Vertebrae 24 (12 precaudal and 12 caudal). **Colour:** body dark blue to chocolate brown dorsally, brownish silvery white laterally, silvery white ventrally; first dorsal-fin membrane blue-black covered with many small black spots; other fins brown-black; usually no bars or spots on body (few exceptions).

**Size:** Maximum to about 3 m; common to 2.5 m.

**Habitat, biology, and fisheries:** Oceanic, highly migratory, usually found above the thermocline. Feeds on a wide variety of fishes, crustaceans, and cephalopods. Good sportsfishing grounds off Florida and in the Caribbean Sea; good commercial fishing grounds off Florida, in the Caribbean Sea, and along southern Brazil and northern Argentina. FAO statistics report landings ranging from 86 to 231 t from 1995 to 1999. Caught mainly with surface longlines (commercial fishing boats) and by trolling (sportsfishermen). Marketed mostly frozen; material for fish processing in Japan.

**Distribution:** Throughout tropical and subtropical (sometimes temperate) waters of the Atlantic Ocean straying northward to Nova Scotia. Densely distributed off Florida, in the Caribbean Sea, and along the Brazilian coast to Argentina.

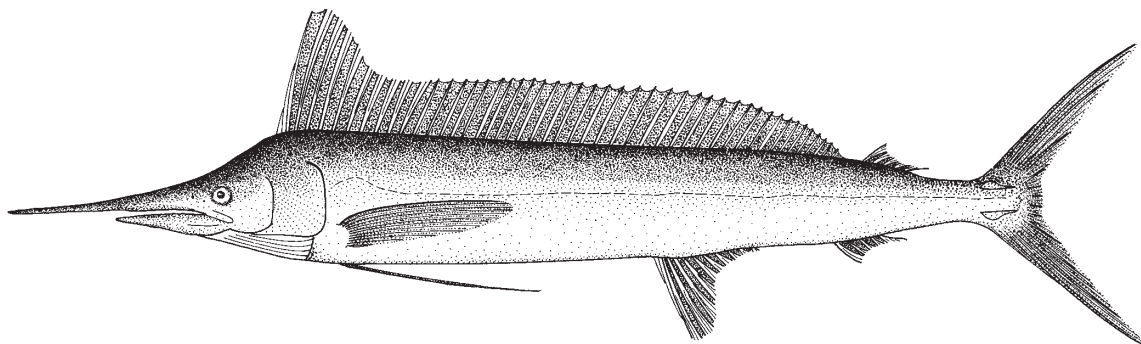


*Tetrapturus pfluegeri* Robins and de Sylva, 1963

SPF

**Frequent synonyms / misidentifications:** None / None.

**FAO names:** En - Longbill spearfish; Fr - Makaïre becune; Sp - Aguja picuda.



**Diagnostic charactes:** Body elongate, much compressed. **Upper jaw prolonged into a moderately slender spear with round cross-section.** Two dorsal fins, **the first (44 to 50 rays) long and moderately high throughout its length**, the second small with 6 or 7 soft rays; **height of anterior part of first dorsal fin slightly greater than body depth**; 2 separated anal fins with 13 to 17 spines (first) and 6 or 7 soft rays (second) respectively; pectoral fins falcate with 18 to 21 soft rays; pelvic fins slightly longer than pectoral fins, consisting of 1 spine and 3 soft rays. Body covered with densely imbedded scales ending in several points. Anus well in front of origin of first anal fin. Vertebrae 24 (12 precaudal and 12 caudal). **Colour:** body dark blue dorsally, brownish silvery white laterally, silvery white ventrally; first dorsal-fin membrane blue-black, unspotted; other fins brown-black; no bars or spots on body (few exceptions).

**Size:** Maximum to about 2.5 m; common to 2 m.

**Habitat, biology, and fisheries:** Oceanic, highly migratory, usually found above the thermocline. Feeds on a wide variety of fishes, crustaceans, and cephalopods. Commercial surface longline fishing grounds (this species not main target but bycatch) offshore in the Atlantic Ocean. Separate statistics are not reported for this species; it is usually reported by the Japanese longliners together with sailfish catches. The total reported catch from Area 31 was 62 t in 1993. Caught with surface longlines as byproduct of commercial longliners for tunas. Marketed mostly frozen.

**Distribution:** Throughout tropical and subtropical (sometimes temperate) waters of the Atlantic Ocean; chiefly distributed in offshore waters.

