

Xiphias gladius (Swordfish)

Family: Xiphiidae (Swordfish)

Order: Perciformes (Perch and Allied Fish)

Class: Actinopterygii (Ray-finned Fish)



Fig. 1. Swordfish, *Xiphias gladius*.

[https://www.flickr.com/photos/pierre_et_nelly/9423515240/, downloaded 4 February 2015]

TRAITS. Sole living species of the family Xiphiidae; swift swimming, highly migratory predators. They have elongate, rounded, blackish-brown (often appears silvery or iridescent) bodies that gradually fade to white on the underside allowing them to blend well with their surroundings. Swordfish have large heads with prolonged bill (sword like protrusion), their bodies are tapered to the rear with large anal fins. They have two dorsal fins, one curved, short and high, separated from the second, which is to the rear of the body and small. Swordfish have low pectoral fins on the sides but no pelvic fins. They have long flattened bills with no teeth on the jaw and large eyes (Fig. 1). They can adapt to large changes in the environment as they are equipped with a system of tissues surrounding their eye muscle that insulates their brains when swimming in low temperature waters (Palko et al., 1981). Males are typically smaller than females (Fig. 2). Males possess testes that produce sperm and females have ovaries that produce eggs for external fertilization. These animals can be as long as of 4.5m and weight up to 650kg.

DISTRIBUTION. Widespread in the Indian, Atlantic and Pacific Oceans including the Mediterranean Sea (Fig. 3); found in temperate to tropical waters between latitude 45°N to 45°S. They are epipelagic (depth zone 0-200m) and mesopelagic (depth zone 200-1000m) fish (Fig. 4) and can feed at the surface, in midwater, or near the sea bottom (Palko et al., 1981; Nakamura, 1985). They can tolerate temperatures between 5-27°C. The larvae are seen in waters with temperatures between 24-29°C. Swordfish can be considered native to Trinidad and Tobago since they migrate here naturally and are found worldwide.

HABITAT AND ACTIVITY. This oceanic species migrates to cooler oceans during the summer season and warmer oceans in the winter season. They are usually observed on surface waters with temperatures above 13°C. Swordfish can be considered both diurnal and nocturnal since they are active during the day and night. They forage in deep waters during the day and go towards the epipelagic layer at night.

FOOD AND FEEDING. The swordfish are top tier predators of the marine pelagic ecosystem (Palko et al., 1981). They are opportunistic feeders; they find their food on the surface of the ocean as well as up to 900m below it. Their diets consist of cephalopods (e.g. squids and octopuses), pelagic and demersal (living near the bottom) fish. Larger swordfish eat larger prey and smaller swordfish eat smaller prey. Swordfish larvae feed on organisms on their level or directly above e.g. larvae of planktophages. Studies have revealed that the long bill is often used to disable larger prey before they are consumed. There is a seasonal shift in diet due to the seasonal migration of the swordfish. These fish are able to survive on both foods at the surface of the ocean as well as the floor.

POPULATION ECOLOGY. Solitary organisms that rarely gather in schools but pair during mating. Age can be determined by counting the number of cross sectional rings on the fin spines. Age of first maturity is about five years old and longevity (life expectancy) is around 15 years (Collette et al. 2011). The number of individuals fluctuates based on fishing activities, but the swordfish is more or less abundant throughout its geographical range.

REPRODUCTION. This species has separate sexes but there are no distinguishing external features between the sexes other than size. Male swordfish have paired elongate testes that produce their sperm while female swordfish have paired elongate ovaries that produce their eggs. Females can carry anywhere between 1 and 29 million eggs. Spawning (female releases her eggs, male follows behind releasing his sperm to fertilize the eggs) occurs year round in warm waters like the Caribbean Sea and Gulf of Mexico, but takes place during summer and spring in temperate waters. The eggs are buoyant and are about 1.7mm in diameter (Palko et al., 1981). Development occurs within two days after fertilization. The swordfish larvae have a very unique look (Fig. 5). Larvae hatch and live near to the surface of the ocean feeding on zooplankton and other fish larvae. Swordfish metamorphose from larvae to adults.

BEHAVIOUR. Swordfish usually swim alone and can be seen jumping or “breaching” above the surface of the water, in an attempt to dislodge parasites like lampreys (Carey and Robinson, 1981). Males can be seen chasing females during the spawning season. Swordfish tend to rely on their speed and agility to evade predators like humans and killer whales. They may communicate with one another by tapping their bill against another fish or flapping their tail. Swordfish have a reputation for being aggressive, as there are numerous reports of them attacking boats (Gudger, 1940).

APPLIED ECOLOGY. These animals are very popular food and gaming species. Swordfish are listed with the World Conservation Union as “data deficient” meaning that biologist have not been able to collect enough data determine whether the species is indeed threatened; although, the US has taken steps to protect the harvesting of juvenile swordfish. There have been reports saying that consuming too much swordfish can be harmful to humans. From their continued consumption of smaller fish, swordfish build up a high mercury content. When pregnant women are exposed to high levels of methylmercury from ingesting fish, it can harm the developing nervous system of the unborn child.

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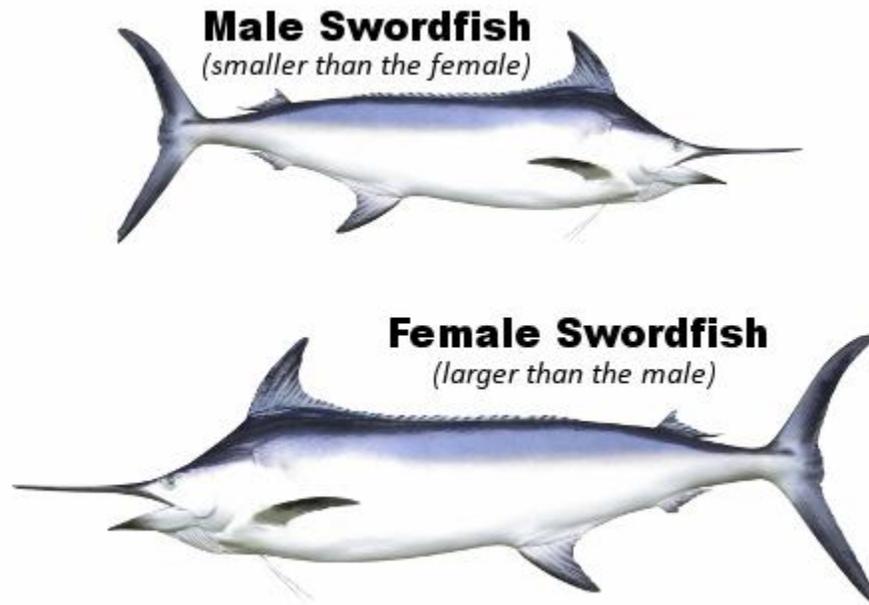


Fig. 2. Comparison of male and female swordfish.

[<http://www.buzzle.com/images/animal-kingdom/swordfish/male-female-swordfish.jpg>, downloaded 18 March 2015]

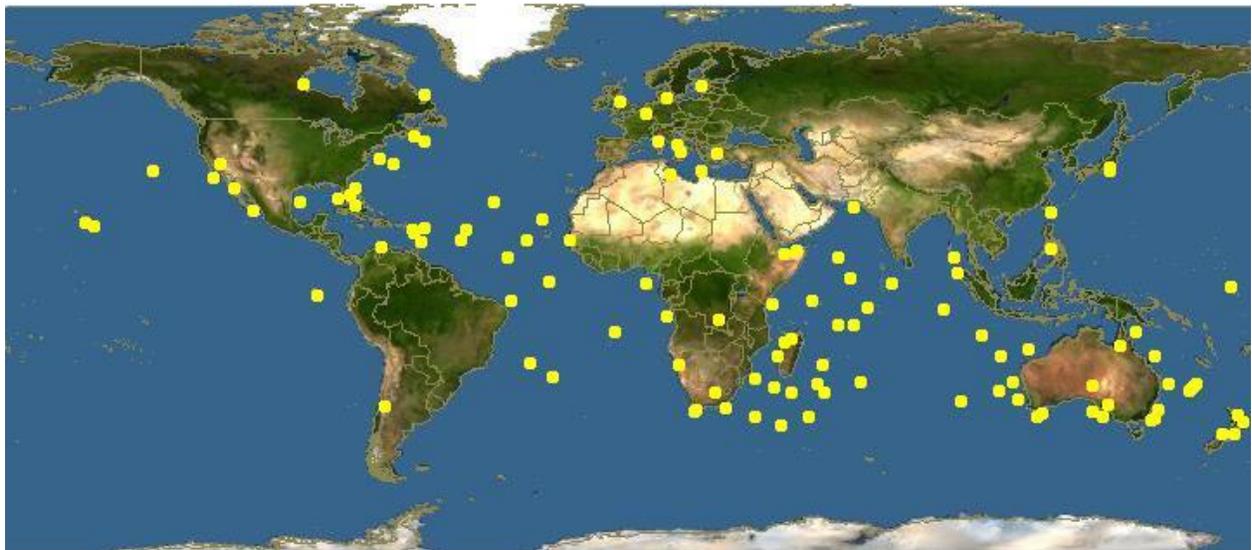


Fig. 3. World distribution of swordfish.

[http://www.discoverlife.org/nh/maps/Vertebrata/Fish/Xiphiidae/Xiphias/map_of_Xiphias_gladius.jpg, downloaded 10 February 2015]

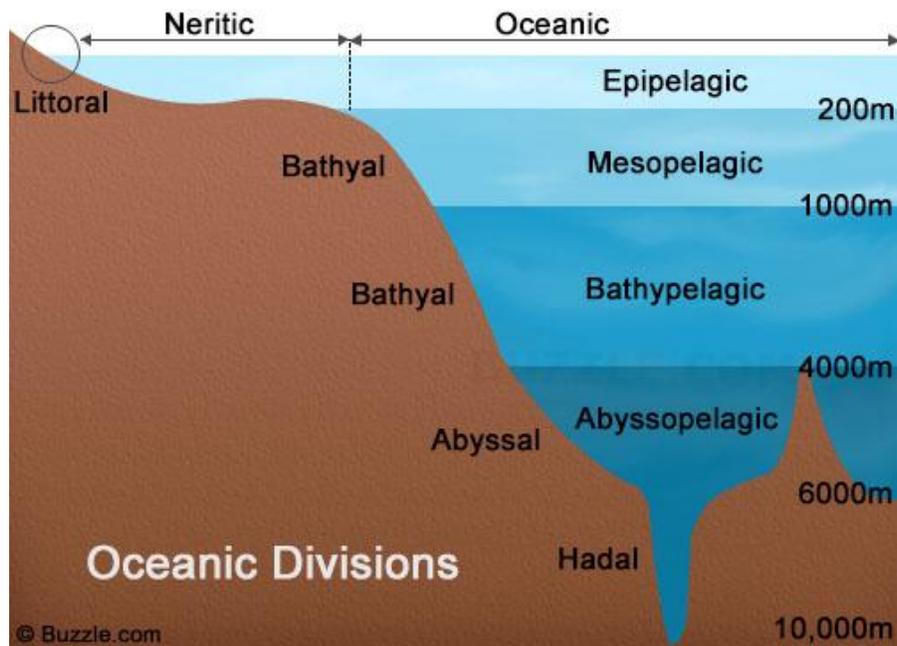


Fig. 4. Oceanic divisions.

[<http://www.buzzle.com/images/geography/oceanic-divisions.jpg>, downloaded 10 February 2015]

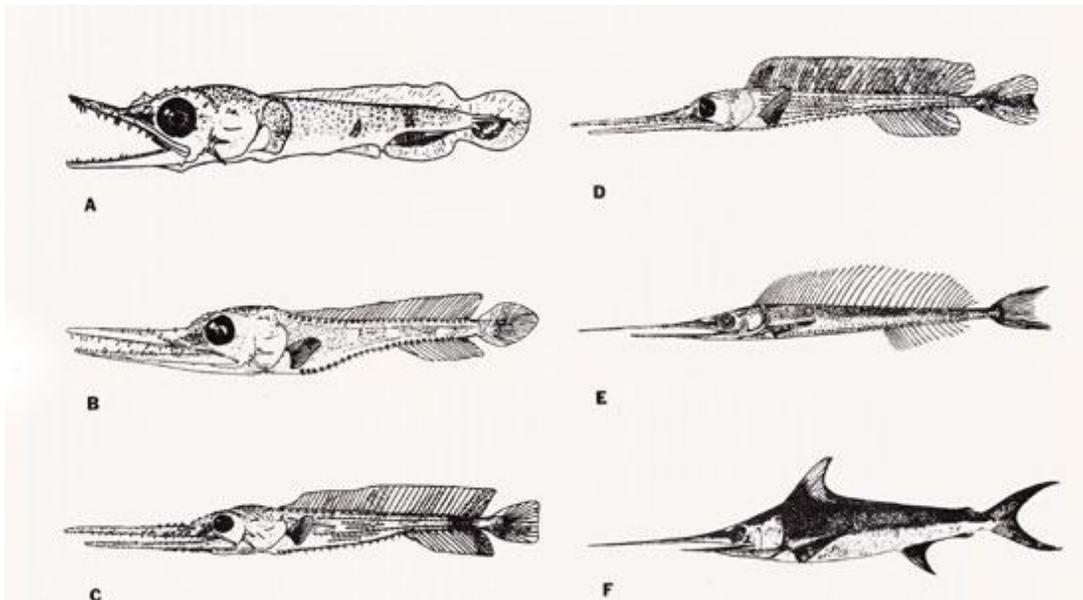


Fig. 5. Development of swordfish larvae to juvenile swordfish.

[<https://www.flmnh.ufl.edu/fish/Gallery/Descript/Swordfish/larvae.JPG>, downloaded 18 March 2015]

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