= Atlantic torpedo =

Tetronarce nobiliana also known as the Atlantic torpedo is a species of electric ray in the family Torpedinidae . It is found in the Atlantic Ocean , from Nova Scotia to Brazil in the west and from Scotland to West Africa and off southern Africa in the east , occurring at depths of up to 800 m (2 @,@ 600 ft) . Younger individuals generally inhabit shallower , sandy or muddy habitats , whereas adults are more pelagic in nature and frequent open water . Up to 1 @.@ 8 m (6 ft) long and weighing 90 kg (200 lb) , the Atlantic torpedo is the largest known electric ray . Like other members of its genus , it has an almost circular pectoral fin disk with a nearly straight leading margin , and a robust tail with a large triangular caudal fin . Distinctive characteristics include its uniform dark color , smooth @-@ rimmed spiracles (paired respiratory openings behind the eyes) , and two dorsal fins of unequal size .

Solitary and nocturnal , the Atlantic torpedo is capable of generating up to 220 volts of electricity to subdue its prey or defend itself against predators . Its diet consists mainly of bony fishes , though it also feeds on small sharks and crustaceans . It is an aplacental viviparous species , wherein the developing embryos are nourished by yolk and later maternally provided histotroph (" uterine milk ") . Females give birth to up to 60 young following a gestation period of one year . The electric shock of this species can be quite severe and painful , though it is not fatal . Because of its electrogenic properties , the Atlantic torpedo was used in medicine by the Ancient Greeks and Romans and became the namesake of the naval weapon . Prior to the 19th century , its liver oil was used as lamp fuel , but it is no longer of any economic value . The International Union for Conservation of Nature (IUCN) has listed this species as Data Deficient ; it is caught unintentionally by commercial and recreational fishers , but the impact of these activities on its population is unknown .

= = Taxonomy = =

The first scientific description of the Atlantic torpedo was published in 1835 by French naturalist Charles Lucien Bonaparte , in his principal work Iconografia della Fauna Italica . Sixteen specimens were designated as the syntypes . The assignment of the southern African " great torpedo " to this species is provisional . Another type of electric ray found in the Indian Ocean off Mozambique may also belong to T. nobiliana . The Atlantic torpedo is placed in the subgenus Tetronarce , which differs from the other Torpedo subgenus Torpedo in having generally plain coloration and smooth @-@ margined spiracles . Other common names include Atlantic electric ray , Atlantic New British torpedo , black torpedo , crampfish , electric ray , numbfish , or torpedo . This species is placed in the genus Tetronarce .

= = Description = =

The Atlantic torpedo has a nearly circular pectoral fin disc 1 @.@ 2 times as wide as it is long , with a thick and nearly straight front margin . The eyes are small and are followed by much larger spiracles , which do not have papillae on their inner rims . The nostrils are close to the mouth ; there is a flap of skin between them three times as wide as long , with a sinuous rear margin . The mouth is wide and arched , with prominent furrows at the corners . The teeth are pointed and increase in number with age , ranging from 38 rows in juveniles to 66 rows in adults ; the first several series of teeth are functional . The gill slits are small , with the first and fifth pairs shorter than the others .

The pelvic fins are rounded and slightly overlapped by the disc at the front . The first dorsal fin is triangular with a rounded apex , originating in front of the pelvic fin insertions . The second dorsal fin is only one @-@ half to two @-@ thirds as large as the first ; the distance between the dorsal fins is less than the length of the first dorsal fin base . The stout tail comprises about one @-@ third of the total length , terminating in a caudal fin shaped like an equilateral triangle with slightly convex margins . The skin is soft and completely devoid of dermal denticles (scales) . The dorsal coloration is a plain dark brown to gray , sometimes with a few diffuse spots , and darkening at the fin margins . The underside is white , with dark fin margins . The largest of the electric rays , the

Atlantic torpedo can measure 1 @.@ 8 m (6 ft) long and weigh 90 kg (200 lb) . However , a length of 0 @.@ 6 ? 1 @.@ 5 m (2 @.@ 0 ? 4 @.@ 9 ft) and weight of 30 lb (14 kg) is more typical . Females attain a larger size than males .

= = Distribution and habitat = =

The Atlantic torpedo is widely distributed in cool waters on both sides of the Atlantic Ocean . In the east , it is found from northern Scotland to the Gulf of Guinea , including the entire Mediterranean Sea (but not the Black Sea) , the Azores , and Madeira , as well as from Namibia to western South Africa . In the west , it occurs from southern Nova Scotia to Venezuela and Brazil . It is rare in the North Sea and the Mediterranean and south of North Carolina .

Juvenile Atlantic torpedoes are primarily bottom @-@ dwelling and usually found at depths of 10 ? 50 m (33 ? 164 ft) over sandy or muddy flats , or near coral reefs . As they mature , they become more pelagic in habits , and adults are often encountered swimming in the open ocean . This species has been recorded from the surface to a depth of 800 m (2 @,@ 600 ft) ; in the Mediterranean , it is most common at depths of 200 ? 500 m (660 ? 1 @,@ 640 ft) . It is said to make long migratory movements .

= = Biology and ecology = =

Like other members of its family , the Atlantic torpedo is capable of generating a powerful electric shock from a pair of kidney @-@ shaped electric organs in its disc , for both attack and defense . These organs comprise one @-@ sixth of the ray 's total weight and contain around half a million jelly @-@ filled " electric plates " arranged in an average of 1 @,@ 025 ? 1 @,@ 083 vertical hexagonal columns (visible beneath the skin) . These columns essentially act as batteries connected in parallel , enabling a large Atlantic torpedo to produce up to a kilowatt of electricity at 170 ? 220 volts , provided that it is well @-@ fed and rested . The discharges from the electric organ occur in a series , or train , of closely spaced pulses each lasting around 0 @.@ 03 seconds . Trains contain on average 12 pulses , but trains of over 100 pulses have been recorded . The ray regularly emits pulses even without an obvious external stimulus .

Solitary in nature , the Atlantic torpedo is often seen resting on or half @-@ buried in the substrate during the day , becoming more active at night . Large and well @-@ defended from attack , it seldom falls prey to other animals . Known parasites of the Atlantic torpedo include the tapeworms Calyptrobothrium occidentale and C. minus , Grillotia microthrix , Monorygma sp . , and Phyllobothrium gracile , the monogeneans Amphibdella flabolineata and Amphibdelloides maccallumi , and the copepod Eudactylina rachelae . Some accounts suggest that this ray may be able to survive out of water for up to a day .

= = = Feeding = = =

The diet of the Atlantic torpedo consists mainly of bony fishes , including flatfishes , salmon , eels , and mullet , though it has also been known to take small catsharks and crustaceans . Captive rays have been observed lying still on the bottom and " pouncing " on fish that pass in front of them . At the moment of contact , the ray traps the prey against its body or the bottom by curling its pectoral fin disc around it , while delivering strong electric shocks . This strategy allows the sluggish ray to capture relatively fast @-@ moving fish . Once subdued , the prey is maneuvered to the mouth with rippling motions of the disc and swallowed whole , head @-@ first . The ray 's highly distensible jaws allow surprisingly large prey to be ingested : an intact salmon weighing 2 kg (4 lb) has been found in the stomach of one individual , and another contained a summer flounder (Paralichthys dentatus) 37 cm (15 in) long . This ray has been known to kill fish much larger than it can eat .

= = = Life history = = =

The Atlantic torpedo is aplacental viviparous : the developing embryos are sustained by yolk , which is later supplemented by protein and fat @-@ enriched histotroph (" uterine milk ") produced by the mother . Females have two functional ovaries and uteruses , and a possibly biennial reproductive cycle . After a year @-@ long gestation period , females bear up to 60 pups during the summer ; the litter size increases with the size of the female . When the embryo is 14 cm (5 @.@ 5 in) long , it has a pair of deep notches at the front of the disc marking the origin of the pectoral fins , and the curtain of skin between the nostrils has not yet developed ; on the other hand , the eyes , spiracles , dorsal fins , and tail have reached adult proportions . Newborn rays measure 17 ? 25 cm (6 @.@ 7 ? 9 @.@ 8 in) long , and still have the anterior notches in the disc . Males and females reach sexual maturity at lengths of 55 cm (22 in) and 90 cm (35 in) respectively .

= = Human interactions = =

Though seldom life @-@ threatening , the electric discharge of an Atlantic torpedo is quite severe and may be enough to knock a person unconscious . However , a greater danger to divers is the disorientation that follows the shock . The Atlantic torpedo is of no commercial value , as its meat is flabby and tasteless . It is caught incidentally by commercial and recreational fisheries in bottom trawls and on hook @-@ and @-@ line . When caught at sea , it is generally discarded or cut up for bait . The International Union for Conservation of Nature (IUCN) does not yet have enough data to assess the Atlantic torpedo beyond Data Deficient ; it could be negatively affected by fishing mortality , though specific data on catch rates and population trends are lacking , as well as by the degradation of coral reefs that are important to juveniles . Its slow reproductive rate would limit its capacity to recover from population depletion .

Various electric fishes , including the Atlantic torpedo , were used in medicine during the classical era . In the 1st century , Roman physician Scribonius Largus wrote of the application of live " dark torpedo " to patients afflicted with gout or chronic headaches . In 1800 , the Atlantic torpedo became the namesake for the naval weapon when American inventor Robert Fulton began using the word " torpedo " to describe bombs that submarines could attach to ships (although these early devices were more akin to modern @-@ day mines) . Before the widespread introduction of kerosene in the 19th century , the liver oil of this species was regarded as of equal quality to sperm whale (Physeter macrocephalus) oil for use in lamps . Before the 1950s , its oil was also used in small quantities by fishermen in the United States as a treatment for muscle and stomach cramps , as well as to lubricate farm machinery . Along with several other species of electric rays , the Atlantic torpedo is used as a model organism in biomedical research because its electric organs are rich in acetylcholine receptor proteins . These proteins play an important role in mediating many neurological processes , such as those involved in the functioning of anesthesia .