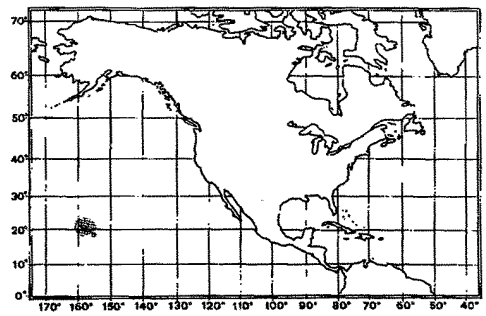
Diagnostic Features: See family.



Geographical Distribution : Known only from the type locality, but likely to be wide-ranging, like other gigantic, plankton-feeding sharks.

Habitat and Biology : At present known only from the holotype, which was caught in the open ocean, in the epipelagic zone near the Hawaiian Islands at 165 m depth. This shark had been feeding on euphausiid shrimp, Thysanopoda pectinata, that averages 3.1 cm in length. As the shark has greatly reduced teeth, very numerous gillraker papillae, on its internal gill slit, and stomach packed with very small euphasiid prey, it can be properly considered a specialized filter feeder like the basking shark (Cetorhinus maximus) and whale shark (Rhiniodon typus). However, the flabby body, soft fins, asymmetrical caudal fin without keels, and weak calcificiation of the megamouth shark suggest that it is much less active than the whale and basking sharks. The only known prey of the megamouth shark is a common epipelagic and mesopelagic shrimp in the area where the shark was captured. The shrimp has a diel migration pattern with a range of. 300 to 1100 m depth during the day; at night it is commonest at 150 to 500 m with a maximum range of 75 to 525 m. When captured, the megamouth shark was apparently at the upper depths where these shrimp are commonest, and possibly might have been feeding on them when it fouled itself by its mouth and teeth on a pair of parachutes being used as sea anchors by a US Navy research vessel. The megamouth shark is the' only known selachian victim of the semiparasitc cookiecutter shark, Isistius brasiliensis, and may be especially vulnerable to Isistius attacks because of its soft skin, midwater habitat, and probable sluggishness. The feeding habits and habitat of the megamouth shark suggest that it will be a rare catch in the future, but it may show up in large purse seines operated by tuna boats. The feeding structures of this shark may allow it to feed on other pelagic invertebrates and even small midwater fishes.

Size : The holotype is an adult male, at 446 cm total length.

Interest to Fisheries : None at present.

Literature : Taylor, Compagno & Struhsaker {1983).

Remarks: This recently described shark, a giant pelagic filter-feeder, is perhaps the most spectacular discovery of a new shark in the Twentieth Century.

8.5 FAMILY ALOPIIDAE Bonaparte, 1838 (emended)

ALOP

Subfamily Alopidiani Bonaparte, 1838 (Family Squalidae), Nuov.Ann.Sci.Nat., Bologna, 2:209.

Synonymy : Family Alopeciae Müller & Henle, 1839; Family Vulpeculidae Garman, 1913.

FAO Names : En - Thresher sharks; Fr - Renards; Sp - Zorros.

Field Marks : Long, curving asymmetrical caudal fin, with dorsal lobe nearly or quite as long as rest of shark, short ventral lobe, long narrow pectoral fins, large to huge eyes.

Diagnostic Features : Trunk cylindrical and moderately stout. Head short, much shorter than trunk; snout moderately long, pointed and conical, not greatly elongated, nor flattened and bladelike; mouth small and arcuate, ventral on head; teeth small to moderately large, compressed and bladelike, in less than 60 rows in either jaw; two rows of small to moderately large anterior teeth on each side of both jaws, the anteriors separated from the upper laterals by a row of small intermediate teeth or a gap; eyes moderately large to very large; gill openings short, not extending onto dorsal surface of head, last two pairs over pectoral fin bases; no gillrakers on internal gill slits. First dorsal fin large, high, erect and angular, second dorsal and anal fins minute, low and with pivoting bases, anal fin base behind second dorsal base; pectoral fins very long and narrow, longer than head in adults; pelvic fins very large, nearly or quite as large as first dorsal fin; caudal fin not lunate, upper lobe greatly elongated, about as long as rest of shark, lower lobe short but strong. Precaudal pits present, caudal peduncle slightly compressed and without keels.

Habitat, Distribution and Biology : Threshers are large, active, strong-swimming sharks, ranging in habitat from coastal to epipelagic and deepwater epibenthic. They are found worldwide in tropical, subtropical and cold-temperate waters. These sharks are apparently specialized for feeding on small to moderately large schooling fishes and squids. Threshers swim in circles around a school of prey, narrowing the radius and bunching the school with their long, straplike caudal fins. The caudal fin is also used as a whip to stun and kill prey, and threshers are commonly tail-hooked on longlines after striking the bait with the caudal tip. The three species of this family broadly overlap in habitat and range, but differences in their structure, feeding habits and spatial distribution

suggest that they reduce interspecific competition by partitioning their habitat and available prey to some extent. Alopias superciliosus, with its huge eyes, relatively large teeth, broad caudal fin, and preference for deeper water coastally near the bottom), takes somewhat larger pelagic fishes (including small billfishas and lancetfishes) as well as bottom fishes; A. vulpinus, with smaller eyes and teeth, a narrower caudal fin, and preference for the surface, takes small pelagic fishes (including clupeids, needlefishes and mackerels) and squids, but also bonitos and bluefishes. The oceanic A. pelagicus is poorly known, but its even smaller teeth and very slender caudal fin suggest that it may take smaller prey than A. vulpinus or A. superciliosus.

Interest to Fisheries : Thresher sharks form an important component of the oceanic shark fishery, particularly because of their high-quality meat which is utilized fresh, frozen, smoked and dried salted. Their fins are used for shark-fin soup, livers for vitamin extraction, and hides for leather. Sizeable pelagic thresher fisheries, utilizing floating longlines, have operated in the northwestern Indian Ocean, the central Pacific, and the western North Atlantic; recently an important pelagic gillnet thresher fishery has started off the California coast in the eastern Pacific. Threshers are also captured offshore and near shore with line gear (including rod and reel) and fixed bottom gillnets.

Remarks: Arrangement of this family follows Bass, d'Aubrey & Kistnasamy (1975b) and Gruber & Compagno (1982), in recognizing a single living genus and three living species.

Alopias Rafinesque, 1810

ALOP Alop

Genus : Alopias Rafinesque, 1810, Caratt.gen.sp.anim.piant.Sicilia, Palermo, pt. 1:13.

Type Species: Alopias macrourus Rafinesque, 1810 by monotypy, a junior synonym of Squalus vulpinus Bonnaterre, 1788).

Synonymy : Genus Vulpecula Jarocki, 1822 (also Garman, 1913);. Genus Alopecias Müller & Henle, 1837; Genus Alopius Swainson, 1838; Genus Alopes Vladykov & McKensie, 1935 (error).

Key to Species

Head nearly flat between eyes; with a deep horizontal groove on nape on each side above gills. Eyes very large, with orbits expanded onto dorsal surface of head. Teeth larger, less than 25 rows in each jaw. First dorsal fin base closer to pelvic bases than pectoral bases ..... **A. superciliosus**

Head strongly arched between eyes; with no horizontal groove or with an inconspicuous one on nape on each side. Eyes smaller, with orbits not expanded onto dorsal surface of head. Teeth smaller, 29 or (usually) more rows in each jaw. First dorsal fin base about equidistant between pectoral and pelvic fin bases or closer to pectoral bases.

2a. Head narrow, snout more elongated, forehead nearly straight. Labial furrows absent. Lateral teeth with well-developed distal cusplets. Pectoral fins nearly straight and broad-tipped. Terminal lobe of caudal shorter, its length from subterminal notch to caudal tip about equal to second dorsal base. Sides above pectoral bases dark, without an extension of the white abdominal area ..... **A. pelagicus**

2b. Head broad, snout shorter, forehead strongly arched. Labial furrows present. Lateral teeth usually without distal cusplets. Pectoral fins falcate and narrow tipped. Terminal lobe of caudal longer, its length from subterminal notch to caudal tip over twice second dorsal base. Sides above pectoral bases marked with a white patch extending forward from the abdominal area ..... **A. vulpinus**

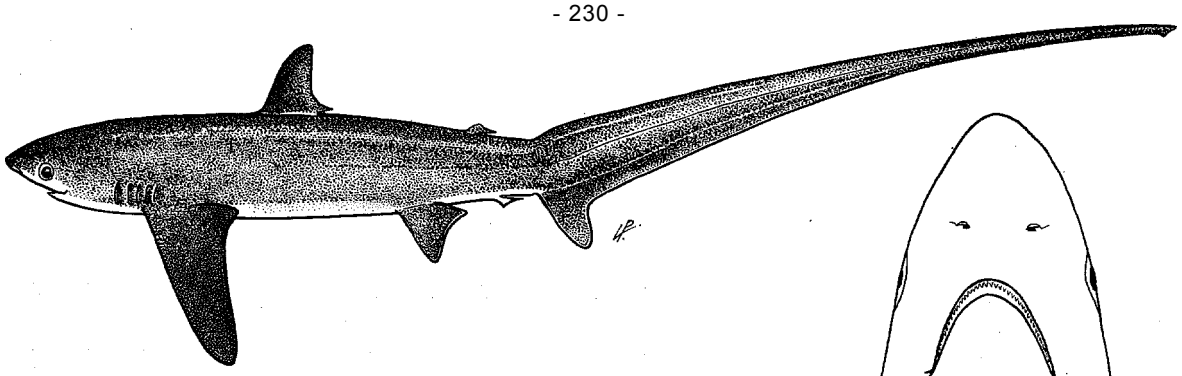
Alopias pelagicus Nakamura, 1935

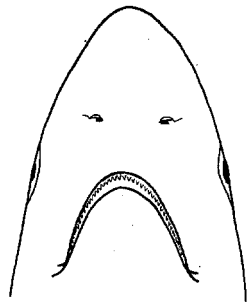
ALOP Alop 3

Alopias pelagicus Nakamura, 1935, Mem.Fac.Sci.Agric.Taihohu Imp.Univ., 14(1):2, 3, pl. 1, fig. 2. Holotype: Uncertain. Type Locality: off Taiwan Province of China), specimens examined in Suo, Taiwan (24°36'N, 52'E) fish market.

Synonymy : None.

FAO Names : En - Pelagic thresher; Fr - Renard pélagique; Sp - Zorro pelágico.

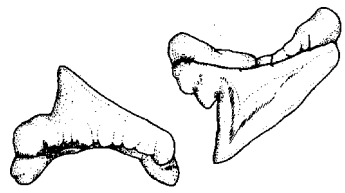




underside of head

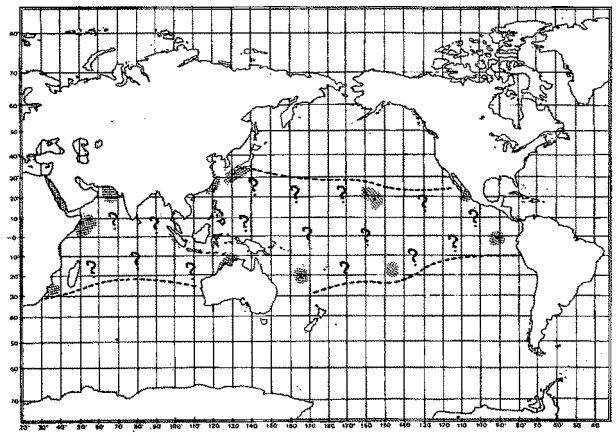
Field Marks : Long dorsal caudal lobe nearly as long as rest of shark, relatively small eyes, straight, broad-tipped pectoral fins, white colour of abdomen not extending over pectoral fin bases.

Diagnostic Features: Eyes moderately large in adults, very large only in newborn and fetuses, with orbits not expanded onto dorsal surface of head; dorsal profile of head convex and forehead moderately convex in lateral view; space between dorsal edges of eyes broadly convex; snout moderately long, conical; an inconspicuous horizontal groove on each side of head above gills; labial furrows absent; teeth small, over 29 rows in either jaw. Pectoral fins not falcate, straight and broad-tipped; terminal lobe of caudal fin very small. White colour of abdomen not extending over pectoral fin bases.



lower and upper tooth

Geographical Distribution : Oceanic and wide-ranging in the Indo-Pacific. Indian Ocean: South Africa, Red Sea, Arabian Sea (off Somalia, between Oman and India, and off Pakistan). Western North Pacific: China, Japan (southeastern Honshu). Western South Pacific: Australia (northwestern coast), New Caledonia, Tahiti. Central Pacific: Hawaiian Islands. Eastern Pacific: Mouth of Gulf of California to Galapagos Islands.



Habitat and Biology : Primarily an oceanic, epipelagic, circumtropical species, but sometimes caught near shore, ranging in depth from the surface to at least 152 m. A little-known, active, strong-swimming species. Ovoviviparous, with at least two young; apparently a uterine cannibal like other species of Alopias. Presumably feeds on small fishes and squid but no details are known. Harmless to people.

Size : This is quite evidently a smaller species than A. superciliosus or A. vulpinus. Maximum total length at least 330 cm, with males adolescent at 192 cm and adult at 276 cm; females may be immature (or adolescent) up to 277 cm, but adults range from 264 to 330 cm (Gohar & Mazhar, 1964, had an adult female 3 m long); size at birth about 96 cm.

Interest to Fisheries : This species has been mainly exploited by the longline fishery in the northwestern Indian Ocean (primarily by the USSR) but it also fished in the Central Pacific and probably elsewhere. Utilized for its meat (for human consumption), liver oil for vitamin extraction, hides for leather, and fins for shark-fin soup.

Literature : Bass, d'Aubrey & Kistnasamy (1975b); Mizue et al. (1981).

Remarks : Nakamura (1935, p. 3) described Alopias pelagicus from three large specimens 285 to 330 cm total length, one of which he illustrated (pl. 1, fig. 2 . He also included a separate description (p. 5) and illustration (pl. 3) of at least one fetus (the one illustrated being about 97 em long) under the name A. pelagicus. Nakamura did not designate type material and did not indicate if one of the three large specimens was the mother of the illustrated fetus or if the latter was separately obtained. Although the large pelagicus specimen illustrated by Nakamura appears to be the same species as the one termed A. pelagicus by Bass, d'Aubrey & Kistnasamy (1975b), the illustrated fetus may be A. vulpinus (recognizable by its small eyes, broad head with a strongly convex dorsal profile, short snout, presence of labial furrows, and falcate pectoral fins). I do not know if designated types exist for A. pelagicus, and if there is a holotype for the species. The name A. pelagicus is tentatively assigned here to the species recognized as pelagicus by Bass, d'Aubrey & Kistnasamy (1975b), with the cautionary note that Nakamura's type specimens (or specimen F if extant, might be based in whale or part on A. vulpinus.

Alopias pelagicus has commonly been mistaken for A. vulpinus. For example, Gohar & Mazhar (1964, Red Sea), Kato, Springer & Wagner (1967, Eastern Pacific), Fourmanoir & Laboute (1976, New Caledonia), Johnson (1978, Tahiti), and Faughnan (1980, Hawaiian Islands) have all published illustrations of this species under the name A. vulpinus. This species maybe more wide-ranging than the present sparse records show, primarily because it has been misidentified as A. vulpinus in the literature.

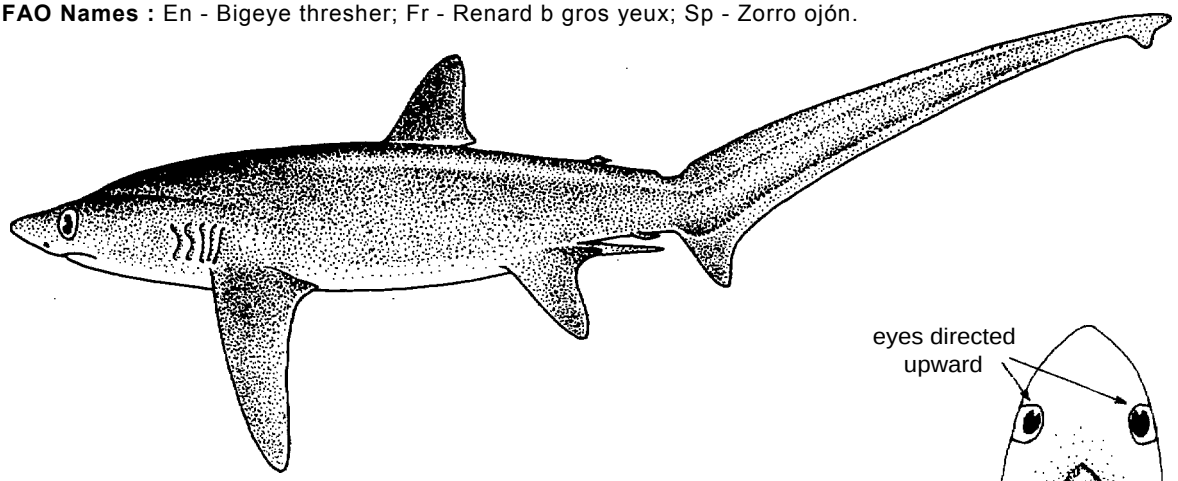
Alopias superciliosus (Lowe, 1839)

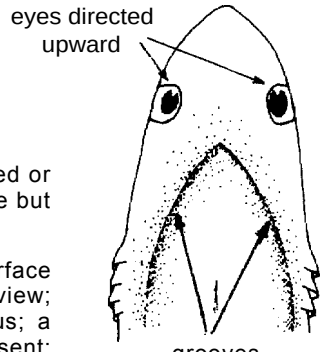
ALOP Alop 1

Alopecias superciliosus Lowe, 1839, Trans.Zool.Soc. London, 3(1):18. Holotype: Unknown. Type Locality: Madeira, eastern Atlantic.

Synonymy : Alopias profundus Nakamura, 1935.

FAO Names : En - Bigeye thresher; Fr - Renard b gros yeux; Sp - Zorro ojón.



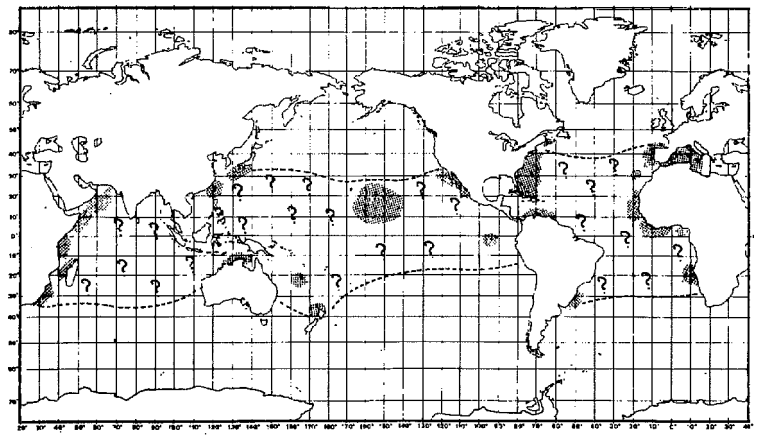


dorsal view of head

Field Marks : Long dorsal caudal lobe nearly as long as rest of shark, notched or helmeted contour of head, huge eyes extending onto dorsal surface of head, falcate but rather broad-tipped pectoral fins.

Diagnostic Features: Eyes very large, with orbits expanded onto dorsal surface of head; dorsal profile of head indented and forehead weakly convex in lateral view; space between dorsal edges of eyes nearly flat; snout moderately long, bulbous; a deep horizontal groove present on each side of head above gills; labial furrows absent; teeth moderately large, less than 25 rows in either jaw. Pectoral fins falcate with broad apices; terminal lobe of caudal fin moderately large. Light colour of abdomen not extending over pectoral fin bases.

Geographical Distribution : Oceanic and coastal, virtually circumtropical. Western Atlantic: New York to Florida (USA), Bahamas, Cuba, Venezuela, and southern Brazil. Eastern Atlantic: Portugal, Madeira, Senegal, Guinea to Sierra Leone, Angola; also Mediterranean Sea. Western Indian Ocean: South Africa, Madagascar, Arabian Sea. Western Pacific: Southern Japan, Taiwan (Province of China), New Caledonia, Australia (northwestern coast), New Zealand. Central Pacific: North and south of Hawaiian Islands. Eastern Pacific: Southern California, Gulf of California and west of Galapagos Islands.



Habitat and Biology : Found in coastal waters over the continental shelves, sometimes close inshore in shallow waters, and on the high seas far from land; sometimes caught near the bottom in deep water. Depths of occurrence range from the surface to at least 500 m.

An epipelagic, neritic, and epibenthic shark, apparently strong-swimming. Ovoviviparous, with uterine cannibalism, number of young usually 2 per litter, but sometimes up to 4. Feeds on pelagic (lancetfishes, clupeoids, scombroids, and. small billfishes) and bottom fishes (hakes); also squids. Apparently stuns its prey with its long caudal fin, as individuals are often tail-hooked on longlines. Apparently harmless to people.

Size : Maximum total length about 461 cm, smallest adult male reported 270 cm and largest about 400 cm, smallest adult female about 355 cm and largest over 430 cm; size at birth between 64 to 106 cm, full term fetuses have been collected at 105 or 106 cm.

Interest to Fisheries : Generally caught in the oceanic longline fisheries operated by the USSR and Japan; especially important areas for these fisheries are the northwestern Indian ocean and the Central Pacific. The

bigeye thresher is a very important component of the Cuban longiine fishery, and has recently been taken in considerable numbers by longliners off the northeastern USA. The species is also taken in fixed bottom and pelagic gillnets, in trawls, and with sportsfishing gear (rod and reel). Its meat is utilized fresh, smoked and dried salted for human consumption, its liver oil is processed for vitamins, its skin for leather, and fins for shark-fin soup.

Literature : Bigelow & Schroeder (1948), Bass, d'Aubrey & Kistnasamy (1975b), Gruber & Compagno (1981); Gillmore (1983), who had two fetuses that were full-term at 105 to 106 cm total length.

Remarks : See Gruber & Compagno (1982) for a discussion of the synonymy of A. profundus with this species, and for a general review of the biology of A. superciliosus.

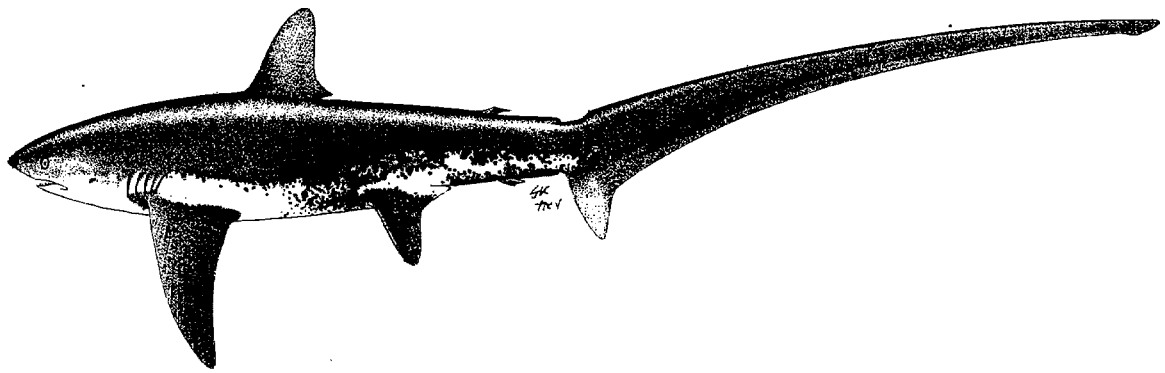
Alopias vulpinus (Bonnaterre,1788)

ALOP Alop 2

Squalus vulpinus Bonnaterre, 1788, Tabl.Encyclop.Méthod. Trois Reg.Nat., Ichthyol., Paris, 9. Holotype: Unknown. Type Locality: Mediterranean Sea.

Synonymy : Squalus vulpes Gmelin, 1789; Alopias macrourus Rafinesque, 1810; Galeus vulpecula Rafinesque, 1810; Squalus alopecias Gronow in Cray, 1854; Alopecias barrae Perez Canto, 1886; Alopecias chilensis Philippi, 1901; Alopecias longimana Philippi, 1901; Vulpecula marina Garman, 1913; Alopias caudatus Phillipps, 1932; Alopias grei Whitley, 1937.

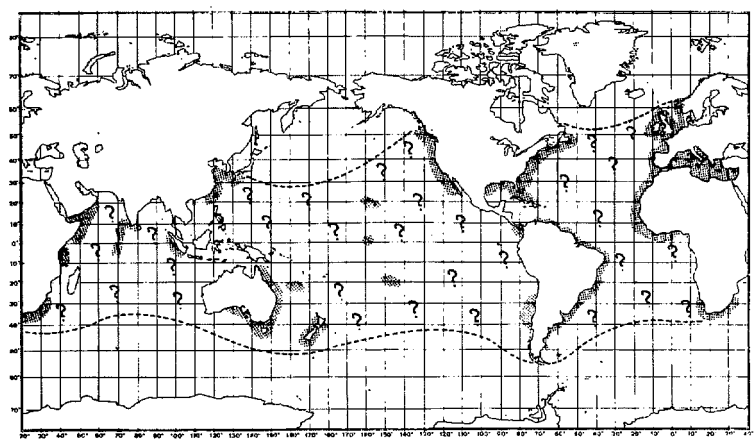
FAO Names : En - Thresher shark; Fr - Renard; Sp - Zorro.



Field Marks: Long curving dorsal caudal lobe about as long as rest of shark, relatively small eyes, falcate, pointed pectoral fins, white colour of abdomen extending over pectoral fin bases.

Diagnostic Features: Eyes moderately large at all sizes, orbits not expanded onto dorsal surface of head; dorsal profile of head convex and forehead strongly convex in lateral view; space between dorsal edges of eyes broadly convex; snout relatively short, conical and pointed; no grooves on head above gills; labial furrows present; teeth small, over 29 rows in either jaw. Pectoral fins falcate and narrow-tipped; terminal lobe of caudal fin moderately large. White colour.of abdomen extending over pectoral fin bases as a conspicuous patch.

Geographical Distribution : Oceanic and coastal, virtually circumglobat in warm seas. Western Atlantic: Newfoundland to Cuba, Gulf of Mexico, Venezuela, Brazil to Argentina. Eastern Atlantic: Norway and British Isles to Mediterranean, Morocco, Ghana and Ivory Coast; also Cape Province, South Africa. Indo-West Pacific: South Africa, Tanzania, Somalia, Maldives, Chagos Archipelago, Gulf of Aden, Pakistan, India, Sri Lanka, Sumatra, Japan, Republic of Korea, China, Australia (Queensland, New South Wales, Victoria, Tasmania, South Australia), New Zealand, New Caledonia. Central Pacific: Society Islands, Fanning Islands, Hawaiian Islands. Eastern Pacific: British Columbia to central Baja California, Panama, Chile.



Habitat and Biology : Coastal over the continental and insular shelves and epipelagic far from land in temperate to tropical waters; young often close inshore and in shallow bays. Depth range from the surface to 366 m.

An active, strong-swimming shark, sometimes leaping out of the water. Populations in the northwestern Indian Ocean show spatial and depth segregation by sex. Ovoviviparous and apparently a uterine cannibal, number of young 2 to 4 in a litter (usually 2). Feeds mostly on small schooling fishes, including mackerels, bluefishes, clupeids, needlefishes, lancetfishes and lanternfishes; also squids, octopuses and pelagic crustaceans, and rarely seabirds. Herds and stuns its prey with its long, whiplike caudal fin, and is often caught on longlines by being tail-hooked. A few attacks on boats are doubtfully attributed to this species but it is otherwise apparently harmless to people, though the size of adults of this species should invite respect. There is an unconfirmed anecdotal account of a fisherman on the western North Atlantic coast of the USA that was decapitated by a tailstroke from a big adult thresher (Mundus & Wisner, 1971). Small specimens have been seen underwater by divers, at the surface or close to the bottom, and have circled them at the limit of visibility without acting aggressively.

Size : Maximum total length 549 cm and possibly to 609 cm, adult males 319 to at least 420 cm, adult females 376 to 549 cm; size at birth 114 to 150 cm.

Interest to Fisheries : Caught in the oceanic longline fisheries operated by the USSR and Japan; especially important areas for these fisheries are the northwestern Indian Ocean and the central Pacific, but the species is caught elsewhere on longlines. Also fished with anchored bottom and surface gillnets, floating gillnets and sportsfishing gear (rod and reel); the species has recently become the object of an important pelagic gillnet fishery off southern California. The meat is highly prized fresh for human consumption but is also eaten smoked and dried salted; the fins are valuable for shark-fin soup; the hide is usable for leather and the liver oil can be processed for vitamins.

Literature : Bigelow & Schroeder (1948), Bass, d'Aubrey & Kistnasamy (1975b).

8.6 FAMILY CETORHINIDAE Gill, 1862

CETOR

Subfamily Cetorhininae Gill, 1862 (Family Lamnoidae), Ann.Lyceum Nat.Hist.N.Y., 7(32):397-8.

Synonymy : Group Selachina Günther, 1870 (Family Lamnidae); Family Selachidae Poey, 1875; Family Halsydridae Whitley, 1934.

FAO Names : En - Basking sharks; Fr - Requins pélerin; Sp - Peregrinos.

Diagnostic Features: Trunk fusiform and moderately stout. Head moderately long but much shorter than trunk; snout moderately long, pointed and conical, not depressed, flattened and bladelike; eyes small; mouth large and arcuate, ventral on head, gill openings extremely large, extending onto dorsal and ventral surfaces of head, all anterior to pectoral fin bases; gillrakers present on internal gill slits, in the form of hairlike modified dermal denticles with extremely elongated crowns; teeth very small, hooklike, not blade-shaped, and in over 200 rows in either jaws; several rows of small anterior teeth in upper jaw, separated from the laterals by a broad gap. First dorsal fin large, high, erect and angular; second dorsal and anal fins moderately large but less than half size of first dorsal, with broad, non-pivotable bases; pectoral fins long and moderately broad, much shorter than head in adults; pelvic fins smaller than first dorsal fin but larger than second; caudal fin lunate, upper lobe moderately long but less than one-third length of rest of shark, lower lobe nearly as long as upper lobe. Precaudal pits present, caudal peduncle depressed and with strong lateral keels.

Remarks : This family has often been placed in synonymy of the family Lamnidae but, as noted by Springer & Gilbert (1976), is very distinct. Its relationship to the Lamnidae remains unclear.

Cetorhinus Blainville, 1816

CETOR Cetor

Genus: Subgenus Cetorhinus Blainville, 1816 (Genus Squalus Linnaeus, 1758), Bull.Sci:Soc.Philomat.Paris, (8):121.

Type Species : Squalus maximus "Linnaeus" (= Gmelin, 1784?), by subsequent designation of Gill (1862), a junior synonym of Squalus maximus Gunnerus, 1765.

Synonymy : Genus Halsydrus Neil, 1809 (nomen nudum); Fleming, 1817, 1822; ? Genus Tetroras Rafinesque, 1809; ? Genus Tetnoras Rafinesque, 1815 (error or emendation?); ? Genus Scoliophis Anon., 1817; Subgenus Selache Cuvier, 1817 Genus Squalus Linnaeus, 1758); Genus Selanche Jarocki, 1822 error ?); Genus Selachus Minding, 1832; Genus Ceteorhinus Agassiz, 1846 (error or emendation?); Genus Polyprosopus Couch, 1867; Genus Cethorhinus Escribano, 1909 error ?); Genus Scapasaurus Marwick, 1942 (nomen nudum).

Remarks : Whitley (1934), followed by Fowler (1941) proposed that the genus Cetorhinus should be replaced by Halsydrus, which was based on the carcass of a 'sea monster' washed ashore in the Orkney Islands and eventually identified as a basking shark. According to Bland & Swinney (1978), Halsydrus as originally proposed was apparently a nomen nudum, separately proposed from descriptions of the Orkney 'monster', and does not comprise a senior synonym of Cetorhinus. The genus Tetroras. (and its variant Tetnoras) is hard to identify from Rafinesque's (1809) generic description, with his claim that Tetroras has four gill openings being plainly erroneous. The description of Tetroras angiova, the only species in the genus, does indeed suggest a basking shark in certain details "denti in forma di raspa ... ha gli occhi piccolissimi, e le aperture delle branchie bastantemente larghe.". However, even if more evidence was available to prove that T. angiova actually was a basking shark, the substitution of Tetroras for Cetorhinus would not serve the stability of zoological nomenclature due to virtually universal usage of Cetorhinus for the genus of the basking shark at present.

Cetorhinus maximus (Gunnerus, 1765)

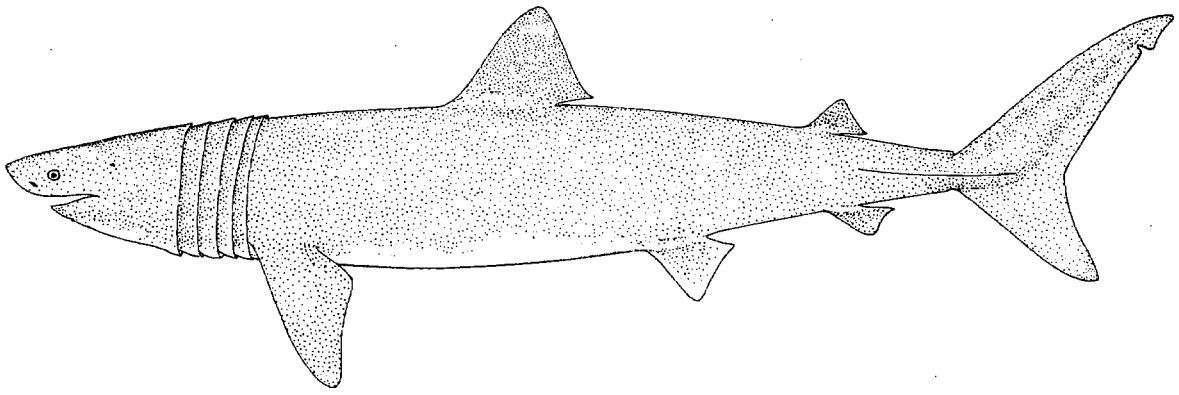
CETOR Cetor 1

Squalus maximus Gunnerus, 1765, K.norske Vidensk-selsk.Skr.Trondh., 33, pl. 2. Holotype: Apparently none. Type Locality: Trondhjem, Norway.

Synonymy : Halsydrus pontoppidani Neill, 1809 (nomen nudum), Fleming, 1817; ? Tetroras angiova Rafinesque, 1809; Squalus gunnerianus Blainville, 1810; Squalus homianus Blainville, 1810; Squalus pelegrinus Blainville, 1810; Squalus peregrinus Blainville, 1811; Squalus (Cetorhinus) gunneri Blainville, 1816; Squalus (Cetorhinus) shavianus Blainville, 1816; ? Scoliophis atlanticus Anon., 1817; Squalus isodus Macri, 1819; Squalus rostratus Macri, 1819; Squalus elephas LeSueur, 1822; Squalus rashleighanus Couch, 1838; Squalus rhinoceros Mitchell, in DeKey, 1842; Squalus cetaceus Gronow, 1854; Polyprosopus macer Couch, 1962; Cetorhinus blainvillei Brito Capello, 1870; Selachus pennantii Cornish, 1885; Cetorhinus maccoyi Barrett, 1933 or Whitley and Phillipps, in Barrett ?); Cetorhinus maximus forma infanuncula Deinse & Adriani, 1953; Cetorhinus maximus normani Siccardi, 1960.

Other Scientific Names Recently in Use : Halsydrus maximus (Gunnerus, 1765); Halsydrus maccoyi (Barrett, 1933); Cetorhinus rostratus (Macri, 1819); Cetorhinus normani Siccardi, 1960.

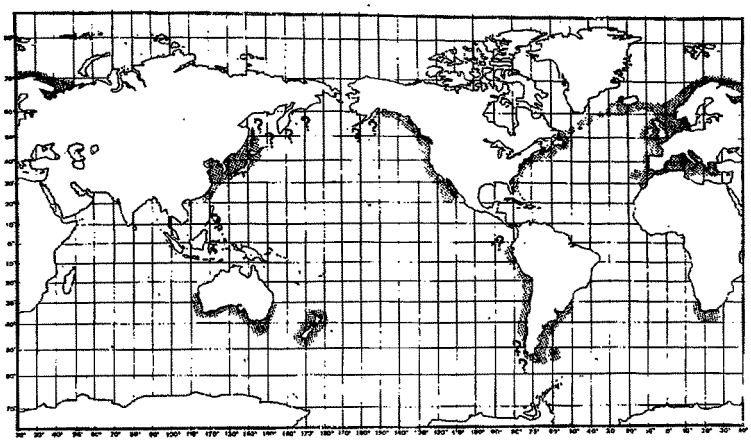
FAO Names : En - Basking shark; Fr - Pélerin; Sp - Peregrino.



Field Marks : The great size, enormous gill slits that virtually incircle the head, dermal denticle gillrakers, pointed snout, huge, subterminal mouth with minute hooked teeth, caudal peduncle with strong lateral keels, and lunate caudal fin distinguish this shark from all others.

Diagnostic Features: See family.

Geographical Distribution : Coastal and amphitemperate. Western Atlantic: Newfoundland to Florida; southern Brazil to Argentina. Eastern Atlantic: Iceland, Norway and western Barents Sea to Mediterranean and Senegal; western Cape Province, South Africa. Western Indian Ocean: Eastern Cape Province, South Africa. Western Pacific: Japan, the Koreas, China; Australia (New South Wales, Victoria, Tasmania, South and Western Australia), New Zealand. Eastern Pacific: Gulf of Alaska to Gulf of California; Ecuador, Peru and Chile, ?Galapagos Islands.



Habitat and Biology : A coastal-pelagic shark found in boreal to warm temperate waters of the continental and insular shelves, occurring well offshore and often very close to land, just off the surf zone; enters enclosed bays. This huge, impressive, conspicuous shark is often seen at or near the surface, singly, in pairs, triads or in schools up to a hundred or more individuals, basking with dorsal fins out of the water or even with bellies upward, or moving slowly forward or in short arcs with their mouths open like hoops while feeding. Surface basking in this shark is thought to be correlated with surface concentrations of food plankton and also with courtship and mating. Two, three or more individuals may swim in tandem, in a straight line or in circles, which suggests to some writers that a row of these sharks swimming together may have been mistaken for a single huge 'sea serpent' in the past. Dead basking sharks are often stranded on a beach, in a state of advanced decay and damaged and partly dismembered from rolling in the surf; several times such carcasses have been misidentified as 'sea serpents' or other fabulous monsters.

Basking sharks have been reported as jumping out of the water, and it has been suggested that they do so to dislodge parasites or comensals like remoras. In addition to the ectoparasitic copepods found on other sharks, basking sharks often have sea lampreys attached to their skin, and although lampreys apparently are unable to cut through the formidable denticle-armored skin of the shark, they may be enough of an irritant to evoke a reaction like jumping or rubbing on objects or the bottom to dislodge them. However, some recent writers doubt that the basking shark can jump, due to its ordinarily slow cruising-speed of some 2 knots, and its reaction to harpooning by speeding up to only about 4 mph without jumping; according to this view; records of jumping in basking sharks result from mistaking leaping dolphins and thresher sharks for them.

The massive liver of the basking shark, contained in a long body cavity, apparently serves at a 'hepatic float' to adjust it to approximately neutral buoyancy.

Basking sharks are highly migratory, and noteworthy for their seasonal appearance in given localities and subsequent disappearance. Off the Atlantic seaboard of North America they appear in the southern part of their range in spring (North Carolina to New York), apparently shift northward in summer (New England, and Canada), and disappear in autumn and winter. Off the eastern North Pacific basking sharks occur in greatest numbers during autumn and winter in the southernmost part of their range there (California), but shift at least in part to more northern latitudes in spring and summer (up Washington and British Columbia). Off the British Isles the bulk of the population there appears in the springtime and disappears by autumn, but individuals may be present at all seasons of the year. Research is currently in progress in the eastern North Atlantic using long range radio tags attached to basking sharks and satellite tracking of the tags to resolve some of the problems of migration in this species. Individuals found off the British Isles in summertime are apparently engaged in courtship activity and copulation, as indicated by behavioural observations and courtship and mating scars found on captured individuals.

Pronounced spatial and seasonal populational segregation may be a characteristic of this species, as suggested by fisheries catches off the British Isles. Most individuals caught there in the summer were subadult, or nonpregnant adult females, outnumbering the males by 40:1, but in the winter the few individuals caught were mostly males. Pregnant females are almost entirely unknown for the species, suggesting that such females are spatially and bathymetrically separated from those members of the population that are regularly seen basking at the surface. Juveniles below 3 m long are also extremely rare, with a single record of a free-living individual about 1.7 m long reported from the British Isles.

Adult, nonpregnant female basking sharks have immense numbers of small eggs in their ovaries. Presumably this shark is ovoviviparous and has uterine cannibalism like other lamnoids, with embryos feeding on the small eggs and possibly smaller siblings, but this remains to be seen. An unconfirmed record of a fetus about 1.7 m long and the above mentioned free-living individual suggests that size at birth may be about 1.7 m, and hence greater than any other known ovoviviparous or viviparous shark.

Age of this shark has been estimated by counting vertebral rings and attempting to correlate them with supposed changes in size of individuals within a population. It has been suggested that birth occurs after 3 and 1/2 year gestation period, and that two calcified rings per year are laid down until maturity at between 6 or 7 years for males. The biannually calibration of the rings is uncertain and controversial; a yearly rate of ring deposition has been suggested, with possible age at maturity for males doubled to 12 to 16 or more years. Whatever the case,

the basking shark has proved to be extremely vulnerable to overfishing, perhaps more so than most sharks, and this can be ascribed to its slow growth rate, lengthy maturation time, long gestation period, probably low fecundity, and probable small size of existing populations (belied by the immense size of individuals in their small schools).

The ,basking shark is one of the three types of huge, filter-feeding sharks, the other two being the megamouth and whale sharks. The basking shark may be unique in relying entirely on the passive flow of water through its pharynx generated by swimming for filtration; the other two giant filter-feeders may assist the process of food ingestion by actively pumping or gulping water and food organisms into their pharynxes. The basking shark feeds exclusively on small planktonic organisms trapped on its unique gillrakers, apparently with the help of mucous secreted in its pharynx. Food items include small copepods, barnacles, decapod larvae, and fish eggs. On the average, a half ton of material may be present in the stomach of these sharks. While feeding the basking shark cruises with mouth widely open and gills distended, occasionally closing its mouth to ingest its prey. An average adult has been estimated to be capable of filtering over 2000 tons of water per hour assuming a constant cruising speed of about 2 knots.

The facts that the basking shark periodically sheds its gillrakers and that plankton densities seasonally fall below levels thought essential to maintain ordinary swimming and metabolic activity in this shark have spawned a controversy over whether or not the species remains active when deprived of gillrakers and high plankton densities. It has been suggested that the basking shark may 'hybernate' on the bottom, perhaps at the edge of continental shelves, until its rakers are replaced and plankton blooms reoccur. Proof of hybernation has never been forthcoming, and an alternate hypothesis has been suggested that the basking shark may turn to benthic feeding when it loses its gillrakers. A possible additional factor is that the massive oil-filled liver of this species may serve as a metabolic store to supply energy to support a reduced rate of activity (slower swimming in colder, deep water) while gillrakers and plankton supplies regenerate. Estimates have been proposed that, in north European waters, the basking shark drops its gillrakers in early winter and takes about 4 or 5 months to fully replace them.

The basking shark is usually quite tolerant of boats approaching closely to it (to its detriment when harpoon fisheries for it have been mounted), and divers have been able to swim right up to individuals and photograph them without invoking an extreme fright reaction. Basking sharks may approach divers quite closely, possibly out of curiosity, and swim around them. This species is regarded as ordinarily harmless and inoffensive but potentially dangerous if attacked (particularly when harpooned). The immense size and power of the basking shark should invite respect, however. Divers should avoid contact with the skin of this shark, which has large dermal denticles with sharp, hooked crowns that point forward and sideways as well as backward; while involved in the dissection of a large basking shark the writer has experienced first hand the lacerations that can result from contact with its skin.

Size : Basking sharks have been credited as reaching a maximum total length of 12.2 to 15.2 m, but even if this is correct most specimens do not exceed about 9.8 m. Males mature at about 4 or 5 m and reach about 9 m, females are mature at 8.1 to 9.8 m. Size at birth unknown; the smallest known free-living individual was 165 cm long. The basking shark is the second largest shark, fish-like vertebrate, and elasmobranch after the whale shark (Rhiniodon typus).

Interest to Fisheries : The basking shark has been the object of smallscale harpoon fisheries from small boats off the Norwegian coast, Ireland and Scotland, Iceland, California, Peru and Ecuador, often sporadically fished due to periodic depletion of basking shark stocks; during the last century they were also harpooned by whaling vessels. Currently they are being heavily fished off China and Japan by harpoon. The basking shark has also been taken in nets, including bottom gillnets and even bottom and pelagic trawls, and sometimes is a problem to salmon gillnetters in the Pacific northwest of North America by fouling gillnets. The basking shark meat is used for human consumption fresh or dried salted; its fins are used for shark-fin soup; its liver, rich in oil and very large, is extracted for its high squalene content but the liver oil was formerly used for tanning leather for lamp oil; the hide for leather; and the carcass for fishmeal.

Literature : Bigelow & Schroeder (1948); Matthews (1950); Matthews & Parker (1950); Van Deinse & Adriani (1953); Parker & Boeseman (1954); Matthews (1956); Siccardi (1961); Parker & Stott (1965); Squire (1967); Springer & Gilbert (1976); Davis (1983); D. Pauly (1983, pers.comm.).

Remarks : Siccardi (1960, 1961) suggested that there are four species of Cetorhinus, two from the North Atlantic and Mediterranean (C. maximus and C. rostratus), one from southern Australia C. maccoyi) and one from the South Atlantic (C. normani . Pending further work, I prefer to follow Springer & Gilbert's 1976) reasoning that there is insufficient evidence at present to separate these species.