

Interest to Fisheries : This is probably the commonest hammerhead in the tropics and is readily available in abundance to isshore artisanal and small commercial fisheries as well as offshore operations; it is caught with pelagic longlines, fixed bottom longlines, fixed bottom nets, and even bottom and pelagic trawls; the young are easily caught on light longline gear. The meat is utilized fresh, fresh-frozen, dried salted and smoked for human consumption; the fins are used to prepare shark-fin soup base; the hides are prepared into leather; the oil used for vitamins; and carcasses for fishmeal.

Literature : Bigelow & Schroeder (1948); Cadenat (1957); Garrick & Schultz (1963); Gilbert (1967); Carvallo (1967); Kato, Springer & Wagner (1967); Clarke (1971); Taniuchi (1974); Bass, D'Aubrey & Kistnasamy (1975a); Compagno & Vergara (1978); Johnson (1978); Compagno (1979, 1982); Klimley (1981); Klimley & Nelson (1981); Nelson (1981); Cadenat & Blache (1981).

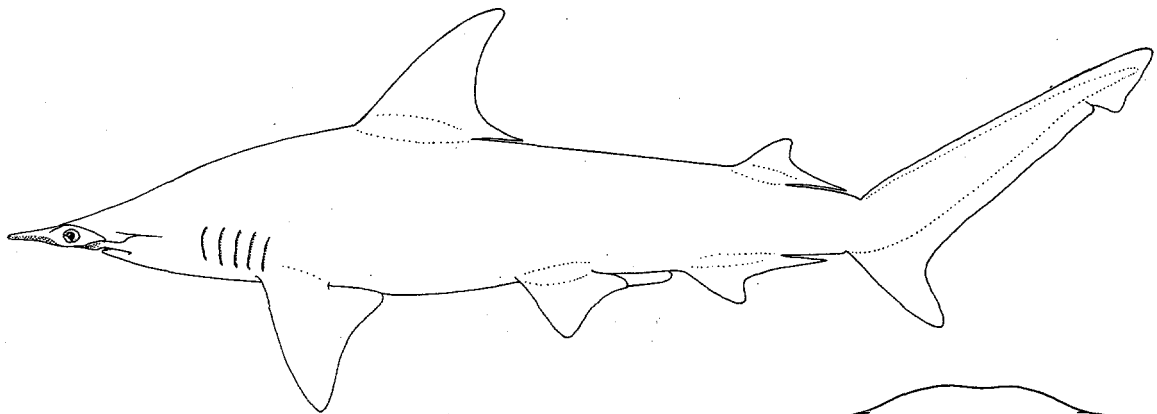
Sphyrna media Springer, 1940

SPHYRN Sphyrn 7

Sphyrna media Springer, 1940, Stanford Ichthyol.Bull., 1(5):162, fig. 3. Holotype: Stanford University Natural History Museum collection, SU-11583, 900 mm adult male. Type Locality: Mazatlan, Sinaloa, Mexico.

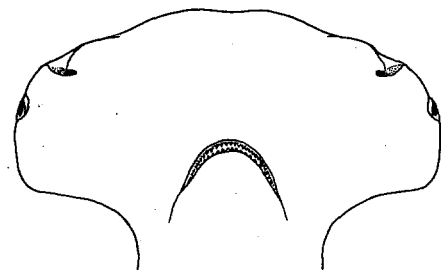
Synonymy : Sphyrna nana Sadowsky, 1965.

FAO Names : En - Scoophead; Fr - Requin-marteau écope; Sp - Cornuda cuchara.

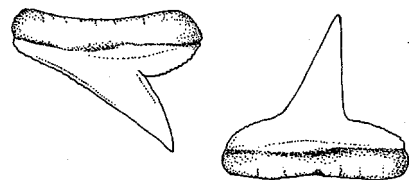


Field Marks: A small hammerhead with a moderately broad, anteriorly arched, mallet-shaped head with weak medial and lateral indentations on its anterior edge and transverse posterior margins, no prenarial grooves, snout rather short and about 1/3 of head width, moderately large, broadly arched mouth, free rear tip of first dorsal fin over pelvic insertions, posterior margin of anal fin nearly straight.

Diagnostic Features: Expanded prebranchial head mallet-shaped and moderately wide but longitudinally expanded also, its width 22 to 33% of total length (mostly above 23%); distance from tip of snout to rear insertions of posterior margins of expanded blades half the width of head or more; anterior margin of head broadly arched, with weak medial and lateral indentations; posterior margins of head narrow, angled transversely, and as broad or somewhat narrower than mouth width; prenarial grooves absent or hardly developed; preoral snout about 1/3 to 2/5 of head width; rear ends of eyes somewhat anterior to upper symphysis of mouth; mouth rather broadly arched; anterior teeth with long slender, smooth-edged cusps, posterior teeth mostly cuspidate and not keeled and molariform. First dorsal moderately falcate, its origin over inner margins of pectoral fins and near their insertions, its free rear tip over pelvic origins; second dorsal fin moderately high, equal to or less than anal height, with a straight to moderately concave posterior margin; its inner margin short, less than twice fin height, and ending well in front to slightly in front of upper caudal origin; pelvic fins not falcate, with straight or slightly concave posterior margins; anal fin larger than second dorsal fin and rather long, base 7.2 to 9% of total length; its origin well ahead of second dorsal origin, its posterior margin shallowly to moderately concave. Total vertebral centra 101 to 196. A small hammerhead, to 1.5 m. Colour grey-brown above, light below, fins unmarked.



underside of head



upper and lower tooth

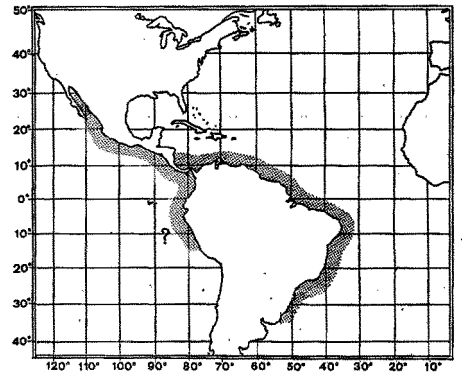
Geographical Distribution : Western Atlantic: Panama to southern Brazil. Eastern Pacific: Gulf of California to Ecuador and probably northern Peru.

Habitat and Biology : A little-known, inshore tropical hammerhead of the American continental shelves.

Size: Maximum about 150 cm, adult male 90 cm, adult females 100 to 133 cm, adolescent female 83 cm; size at birth 34 cm or less.

Interest to Fisheries : Taken with bottom longlines and utilized fresh for human consumption and for fishmeal.

Literature : Springer (1940); Beebe & Tee-Van (1941); Sadowsky (1965, 1967); Gilbert (1967); Kato, Springer & Wagner (1967); Chirichigno (1980).



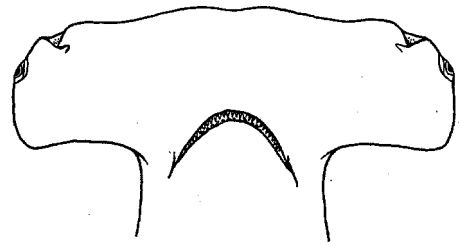
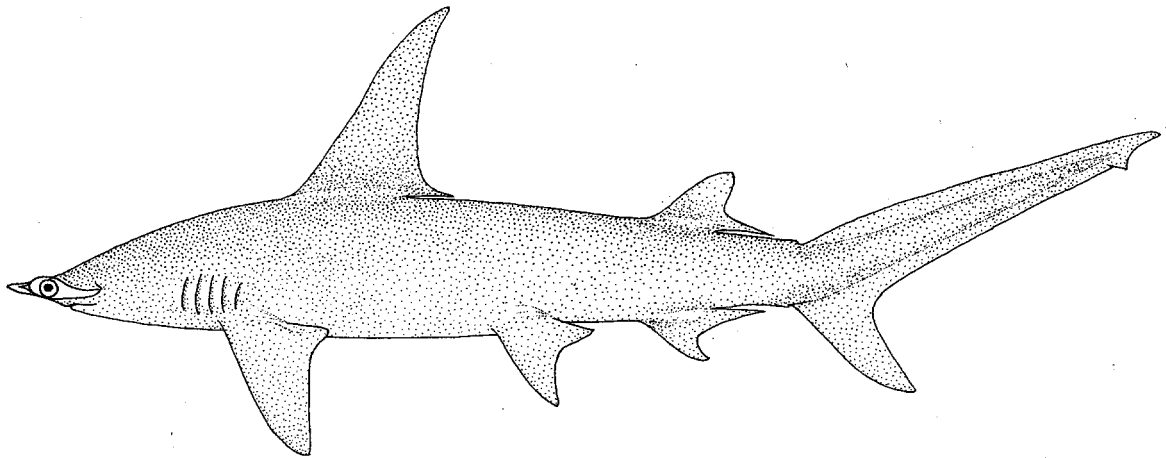
Sphyrna mokarran (Rüppell, 1837)

SPHYRN Sphyrn 3

Zygaena mokarran Rüppell, 1837, *Neue Wirbel.faun.Abyssinien, Fische rothen Meeres*, (11):64, pl. 18, fig. 1. Holotype: According to Klausowitz (1960:293) there is a lectotype, Naturmuseums Senckenberg SMB 3590, 2515 mm stuffed adult or adolescent male. Type Locality: Massaua, Red Sea.

Synonymy : *Zygaena dissimilis* Murray, 1887; *Sphyrna ligo* Fraser-Brunner, 1950.

FAO Names: En - Great hammerhead; Fr - Grand requin-marteau; Sp - Cornuda gigante.



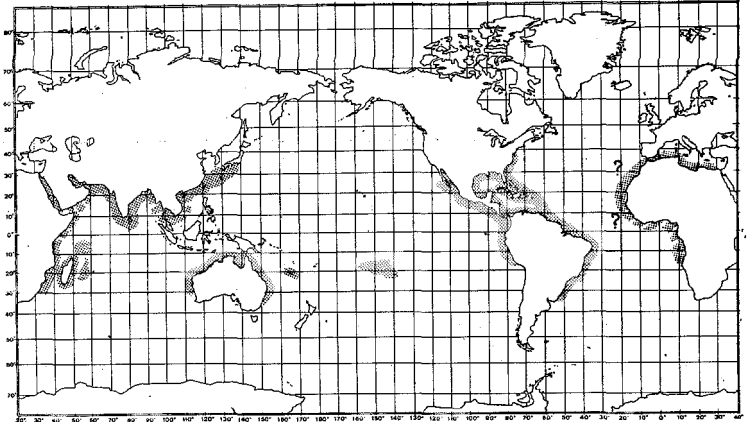
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Field Marks : An easily recognized large hammerhead with anterior margin of head nearly straight in adults and with a median indentation, strongly serrate teeth, strongly falcate first dorsal fin with rear tip in front of pelvic origins, high second dorsal fin with strongly concave posterior margin and short inner margin, falcate pelvic fins, and a deeply notched posterior anal margin.

Diagnostic Features: Expanded prebranchial head hammer- or axe-shaped and very wide but longitudinally short, its width 23 to 27% of total length (mostly above 23%); distance from tip of snout to rear insertions of posterior margins of expanded blades less than half of head width; anterior margin of head very broadly arched in young but nearly straight in adults, with prominent medial and lateral indentations; posterior margins of head long, angled posterolaterally in young but transverse in adults, and about as broad as mouth width; prenarial grooves absent or hardly developed; preoral snout less than 1/3 of head width; rear ends of eyes anterior to upper symphysis of mouth; mouth rather broadly arched; anterior teeth with moderately long stout cusps, strongly serrated edges, posterior teeth mostly cuspidate and not keeled and molariform. First dorsal strongly falcate, its origin over or slightly behind pectoral insertions, its free rear tip well anterior to pelvic origins; second dorsal fin high, about equal to anal height, with a strongly concave posterior margin; its inner margin short, about equal to

fin height, and ending well in front of upper caudal origin; pelvic fins strongly falcate, with strongly concave posterior margins; anal fin about as large as or larger than second dorsal fin, and moderately long, its base 5.6 to 7.3% of total length, its origin well ahead of second dorsal origin, its posterior margin deeply notched. Total vertebral centra 197 to 212. A large to gigantic hammerhead to 3 to 5.5+ m. Colour grey-brown above, light below, without fin markings.

Geographical Distribution : Circum-tropical. Western Atlantic: North Carolina to Brazil, including Gulf of Mexico and Caribbean. Eastern North Atlantic: Morocco, Senegal, ?Canary Island, ?Gambia, ? Guinea; Mediterranean. Indo-West Pacific: South Africa and Red Sea to India, Thailand, China, Taiwan Island, Riu Kyu Islands, Australia (Northern Territory, Queensland, New South Wales), New Caledonia, French Polynesia. Eastern Pacific: Southern Baja California and Gulf of California to Panama, Ecuador and northern Peru.



Habitat and Biology : A coastal-pelagic and semi-oceanic tropical hammerhead occurring close inshore and well offshore, over the continental shelves, island terraces, and in passes and lagoons of coral atolls, as well as over deep water near land; depths range from near the surface and in water about a metre deep to over 80 m. The great hammerhead often favours continental and insular coral reefs. It apparently is nomadic and migratory, with some populations moving poleward in the summer, as off Florida and in the South China Sea.

Viviparous, with a yolk-sac placenta; number of young 13 to 42. Sex ratios of fetuses are, approximately 1:1. The gestation period may be at least 7 months. Birth occurs in late spring or summer in the Northern Hemisphere.

The great hammerhead takes a variety of prey, but seems especially to favour stingrays and other batoids, groupers and sea catfishes. Its diet includes tarpon, sardines, sea catfishes, toadfish, porgies, grunts, jacks, croakers, groupers and other serranids, tongue-soles, boxfishes, porcupine fishes, smooth-hounds (*Mustelus*) and other sharks, guitarfish, skates, stingrays, cownosed rays, crabs and squid. This species seems not to be bothered by the poisonous spines of its stingray and catfish prey, and is sometimes found with stings imbedded in its buccal cavity (one had about fifty stings in its mouth, throat and tongue). This and other large hammerheads were the first to reach newly baited sharklines in the Florida shark fishery, indicating a particularly keen olfactory sense.

This species is thought to be dangerous to people, though few if any attacks can be definitely attributed to it because of the apparent difficulty of distinguishing the large hammerhead species involved in attacks. In unbaited situations these hammerheads have approached divers but behaved unaggressively. The size and rather broad food spectrum of the great hammerhead, plus the considerable number of attacks attributed to hammerheads in general, make it a shark to be treated with respect and caution.

Size : Maximum 550 to 610+ cm, but most adults of either sex not above 366 cm; a small percentage of the population (mainly or entirely females?) attain a size much greater than the adult average; males maturing at about 234 to 269 cm and reaching at least 341 cm; females maturing at about 250 to 300 cm and reaching 482 to 549+ cm; size at birth 50 to 70 cm.

Interest to Fisheries : Although less abundant than *S. lewini*, this species is regularly caught in the tropics, with longlines, fixed bottom nets, hook-and-line, and possibly with pelagic and bottom trawls. This species is utilized for its meat, fresh, fresh-frozen, dried salted and smoked for human consumption; for hides, processed into leather; for fins used for shark-fin soup base; for liver oil, processed for vitamins; and carcasses for fishmeal.

Literature : Bigelow & Schroeder (1948); Cadenat (1957); Springer (1960, 1963); Fourmanoir (1961); Garrick & Schultz (1963); Randall (1963); Clark & von Schmidt (1965); Gilbert (1967, a); Carvallo (1967); Sadowsky (1971); Taniuchi (1974); Bass, D'Aubrey & Kistnasamy (1975b); Johnson (1978); Compagno (1981); Cadenat & Blache (1981).

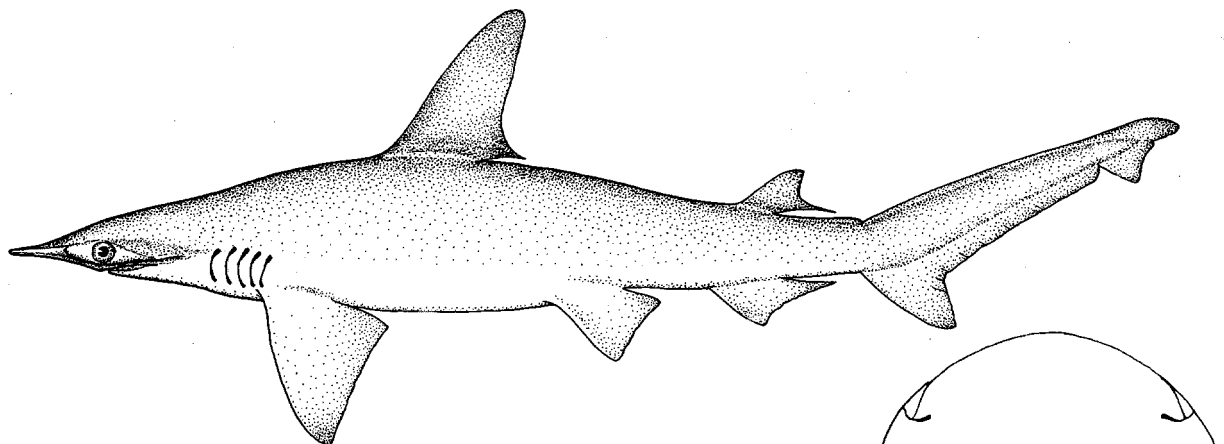
Sphyrna tiburo (Linnaeus, 1758)

SPHYRN Sphyrn 2

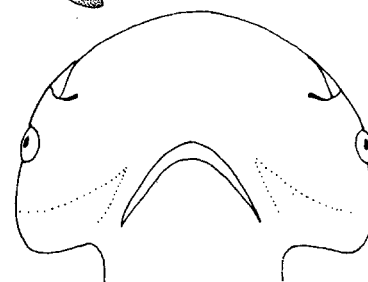
Squalus tiburo Linnaeus, 1758, Syst.Nat., 10, 1:234. Holotype: None. Type Locality: "Habitat in America".

Synonymy : Sphyrna vespertina Springer, 1940.

FAO Names : En - Bonnethead; Fr - Requin-marteau tiburo; Sp - Cornuda tiburo.



Field Marks: A small hammerhead with a unique, very narrow, shovel-shaped head without indentations on its anterior edge, enlarged, molariform posterior teeth, first dorsal rear tip in front of pelvic origins, and shallowly concave posterior anal margin.

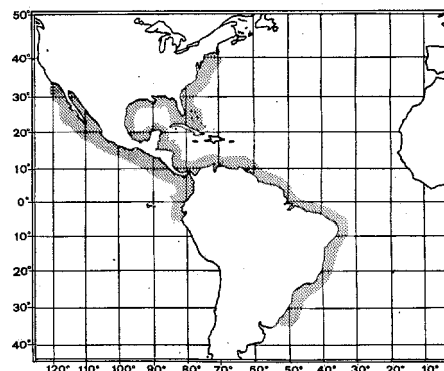


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Diagnostic Features: Expanded prebranchial head shovel-shaped and rather narrow but longitudinally elongated, its width 18 to 25% of total length (mostly below 21%); distance from tip of snout to rear insertions of posterior margins of expanded blades over half of head width; anterior margin of head broadly arched or somewhat angular, without indentations; posterior margins of head short, transverse, or angled posterolaterally, and generally narrower than mouth width; preauricular grooves not present anteromedial to nostrils; preoral snout about 2/5 of head width; rear ends of eyes slightly anterior to about opposite upper symphysis of mouth; mouth rather broadly arched; anterior teeth with short, stout cusps, not serrated, posterior teeth cusplless, keeled, somewhat expanded, and resembling the molariform teeth of Heterodontus species. First dorsal moderately falcate, its origin over inner margins of pectoral fins and well behind their insertions, its free rear tip usually somewhat anterior to pelvic origins; second dorsal fin moderately high, about as high as anal, with a strongly concave posterior margin; its inner margin moderately long, less than twice fin height, and ending well ahead of upper caudal origin; pelvic fins not falciform, with posterior margins straight or nearly so; anal fin larger than second dorsal fin and rather long, its base 6.4 to 8.5% of total length, its origin well in front of second dorsal origin, its posterior margin shallowly concave to nearly straight. Total vertebral centra 142 to 173. A small hammerhead, to about 1.5 m. Colour grey or grey-brown above, light below, often with small dark spots on sides of body.

Geographical Distribution : Western Atlantic: From North Carolina and exceptionally Rhode Island, USA, to southern Brazil, also Cuba and the Bahamas. Eastern Pacific: Southern California, USA to Ecuador.

Habitat and Biology : An abundant, inshore, coastal, continental and insular shelf species, in shallow water over mud and sand bottoms, also on coral reefs; commonly found in estuaries, shallow bays and channels, at depths between 10 and 25 m, but down to at least 80 m and into the surf zone and the intertidal. Off Florida it fluctuates in numbers with the seasons, being virtually absent in summer but present in numbers in spring and autumn; large schools have been seen in the autumn there. Along the Atlantic coast of the USA it is a common summer visitor as far north as New England, but it apparently migrates southward with decreasing water temperatures in autumn and winter. Considerable sexual segregation occurs in this species as in many others, and adult females often predominate in the shallows during the pupping season. This shark usually occurs in small groups of 3 to 15 individuals, and seldom is found alone.



In a pioneering six-month behavioural study of a colony of ten bonnetheads in a semi-natural enclosure in Florida, Myrberg & Gruber (1974) were able to elucidate the complex and subtle behaviour of this shark. Some eighteen postures and action patterns were discovered, along with a diel rhythm of activity peaking in the late afternoon and a definite dominance hierarchy at least partially based on size and sex. About half of the action patterns had a social content, and some agonistic behaviour was observed, though the sharks had a low level of intraspecific aggression and never fought. The sharks were very active and in seemingly constant motion day and night: they normally engaged in "patrolling" in a straight line just above the bottom, with larger sharks moving faster than smaller. These sharks might suddenly engage in "manoeuvring", whipping around in sharp lateral turns apparently to orient to a given spot or a prey item; and "explosive-glide", suddenly swimming rapidly followed by a long glide and sometimes a darkening in colour. Other action patterns by single sharks included "head-shake", lateral shaking of the head to left and right; "head-snaps", rolling of the shark followed by a slight upward and rapid and long downward displacement of its head, in a diagonal plane; "jaw-snap", opening and closing the mouth rapidly in succession once or twice, occurring during feeding sessions or when "patrolling"; "chafe", suddenly rolling with the body coming in minimum contact with the bottom, possibly to remove parasites; "gill-puff", momentary expansion of the gill area often seen after a shark ingested something or after tight "manoeuvring" that disturbed the substrate, possibly to clear the pharynx; and two patterns by males, simple "clasper-flexion", flexing a clasper anteriorly while "patrolling", and "clasper-flexion-with thrust", rolling to one side, flexing a clasper, and then accelerating at speed for a few metres. Action patterns with a social context include "circling-head-to-tail", where two sharks tightly circle each other head to tail; "approach-over-the-body", sudden overtaking of a shark by another from the rear, placing the approaching shark with its head about opposite the predorsal back of the other; "hit", an "approach-over-the-body" culminating in a ventral flicking of the head by the approaching shark onto the interdorsal back of the approached shark, which accelerates off and often shows a contused area where the first shark struck it; "hunch", arching the back, displacing the pectoral fins downward, dropping the caudal fin and raising the head, done in the presence of other bonnetheads and human observers; "turn-back", one shark going in the opposite direction reverses course and follows a second; "follow", one shark closely following another and repeating its movements; "follow-formation", three to six sharks following a leader in a single line, and varying their course after the leader's movements; and "give-away", with two sharks on a head-on collision course, having one deflecting to either side of the other. "Approaches" and "hits" were often scored by resident sharks on newcomers to the containment, especially by small males and females. The "hunch" is similar in many of its components to the spectacular threat display of the grey reef shark (Carcharhinus amblyrhynchos) and probably is also a threat display. "Turn-back", "follow", and the rare "follow-formation" were usually seen in the context of males following females, but sometimes the reverse occurred. "Give-away" data pointed to the existence of a definite social hierarchy, in which the largest shark, a female, was dominant and never gave way to any of the others in head-on approaches, but in which larger males may have been more dominant than equal-sized females. Territoriality, either by individuals or by the group, was not apparent in Myrberg & Gruber's experimental bonnethead colony.

Viviparous, with a yolk-sac placenta; number of young 4 to 16 per litter. Off Florida there may be a spring and autumn mating season in the bonnethead, or alternatively mating the year round. Off Brazil it apparently mates in the spring.

The bonnethead is primarily a crustacean feeder that eats crabs, shrimp, manis shrimp, isopods, and even barnacles, but also bivalves, octopi and small fish.

Size : Maximum about 150 cm, males maturing between 52 and 75 cm and reaching at least 124 cm, females mature at 84 cm or less and reaching at least 130 cm; size at birth about 35 to 40 cm.

Interest to Fisheries : An abundant inshore shark, commonly taken by smallscale fisheries; caught with shrimp trawls, trammel nets, bottom longlines, and hook-and-line, and utilized fresh, fresh frozen, or dried salted for human consumption; also processed into fishmeal.

Literature : Springer (1938); Bigelow & Schroeder (3946); Baughman & Springer (1950); Clark & von Schmidt (1965); Sadovsky (1965, 1967); Gilbert (1967); Myrberg & Gruber (1974); Compagno & Vergara (1978); Compagno (1979).

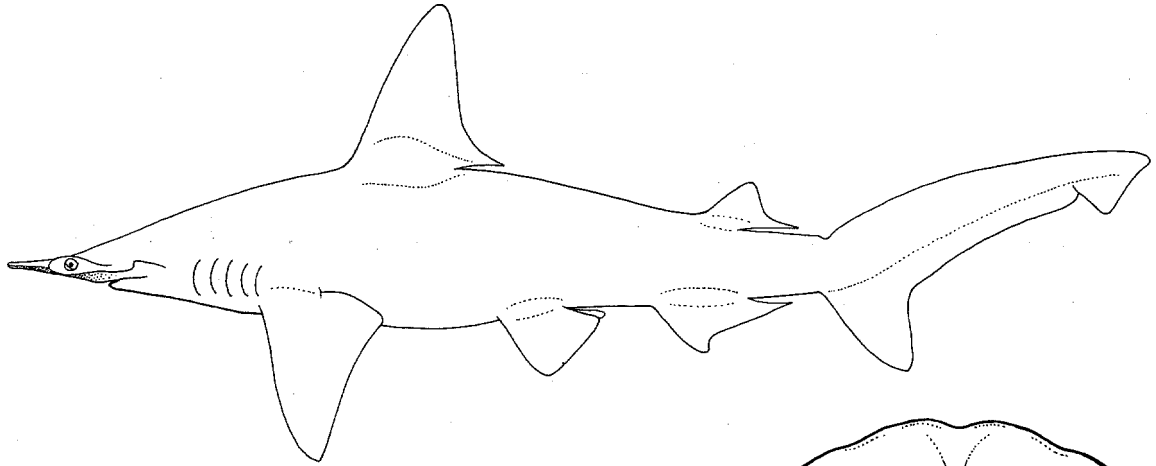
Sphyrna tudes (Valenciennes, 1822)

SPHYRN Sphyrn 8

Zygaena tudes Valenciennes, 1822, Mem.Mus.Hist.Nat.Paris, 9:225, pl. 2, fig. 1. Lectotype: Museum National d'Histoire Naturelle, Paris, MNHN 1049, 346 mm immature female, designated by Gilbert (1967:65). Syntypes in Museum National d'Histoire Naturelle, Paris, MNHN 1019, from Cayenne, French Guiana, MNHN 1049, a 346 mm female from off Nice, France, and a third specimen, apparently lost, from Coromandel, India. MNHN 1049 was selected as a Lectotype by Gilbert (1967; see remarks below). Type Locality: Nice, France, Mediterranean Sea.

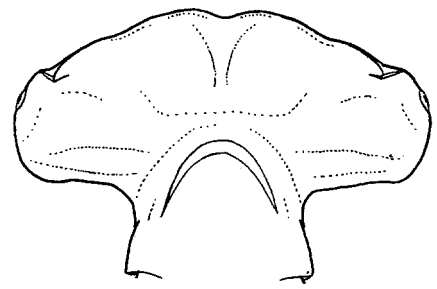
Synonymy : Sphyrna bigelowi Springer, 1944.

FAO Names : En - Smalleye hammerhead; Fr - Requin-marteau à petits yeux; Sp - Cornuda ojichica.

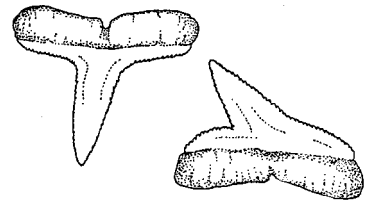


Field Marks: A small hammerhead with a moderately broad, anteriorly arched, mallet-shaped head with medial and lateral indentations on its anterior edge and transverse posterior margins, strong prenarial grooves present on front edge of head, snout rather short and less than 1/3 of head width, moderately large, broadly arched mouth, free rear tip of first dorsal fin over pelvic insertions, posterior margin of anal fin moderately concave and not deeply notched.

Diagnostic Features: Expanded prebranchial head hammer-or axe-shaped and very wide but longitudinally fairly long, its width 28 to 32% of total length (mostly above 28%); distance from tip of snout to rear insertions of posterior margins of expanded blades about 2/5 of head width; anterior margin of head broadly arched with prominent medial and lateral indentations; posterior margins of head wide, transverse, and generally broader than mouth width; well-developed prenarial grooves present anteromedial to nostrils; preoral snout about 1/4 to slightly less than 1/3 of head width; rear ends of eyes slightly anterior to upper symphysis of mouth; mouth rather narrowly arched; anterior teeth with moderately long, slender, smooth or weakly serrated cusps, posterior teeth mostly cuspidate and not keeled and molariform. First dorsal slightly falcate, its origin slightly behind pectoral insertions, its free rear tip about over pelvic origins; second dorsal fin fairly high, less than anal height, with a shallowly or moderately concave posterior margin; its inner margin moderately long, but less than twice fin height, and ending well in front of upper caudal origin; pelvic fins not falcate, with straight or slightly concave posterior margins; anal fin larger than second dorsal fin and rather long, its base 7.5 to 9.9% of total length; its origin well ahead of second dorsal origin, its posterior margin shallowly to moderately concave. Total vertebral centra 195 to 202. A small hammerhead, to 1.5 m. Colour grey-brown above, light below, fins without markings.



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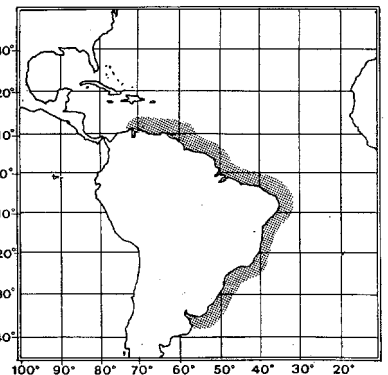
upper and lower tooth

Geographical Distribution: Western Atlantic: Venezuela to Uruguay. Records of this species from off Mississippi in the northern Gulf of Mexico (Gilbert, 1967a) were probably incorrect (Robins *et al.*, 1980). The original Mediterranean record of this shark by Valenciennes (1822) may also be and based on *S. couardi* (Cadenat & Blache, 1981; see remarks below).

Habitat and Biology : A little-known inshore shark of the continental shelf, found down to at least 12 m depth.

Viviparous, with a yolk-sac placenta; number of young probably 6 to 9 per litter.

Feeds on small bony fishes, including sea catfish and grunts, but also newborn scalloped hammerheads (*S. lewini*), swimming crabs, squid, and shrimp.



Size : Maximum about 150 cm, adult males 110 to 134 cm, adult females 120 to 148 cm; size at birth about 30 cm.

Interest to Fisheries : A locally abundant species taken in coastal fisheries but with details of gear and utilization not reported. Reported very common off the Guianas in the western Atlantic but uncommon elsewhere there and rare in the eastern Atlantic and Mediterranean.

Literature: Bigelow & Schroeder (1948); Tortonese (1950a); Sadowsky (1965, 1967); Gilbert (1967, a); Compagno (1979, 1981); Cadenat & Blache (1981).

Remarks : The name Sphyrna tudes was long applied to the great hammerhead (see Bigelow & Schroeder, 1948), while Springer (1944) described S. bigelowi for the present species. However, Tortonese (1950a) and Gilbert (1967) noted that the specimen illustrated by Valenciennes (1822) as S. tudes from Nice, France and another late embryo mentioned by him from Cayenne, French Guiana (the two remaining syntypes in the Museum National d'Histoire Naturelle, Paris) are conspecific with Springer's material of S. bigelowi, and that the next available name, S. mokarran, must be used for the great hammerhead. Gilbert (1967) suggested that the third, lost syntype of S. tudes from Coromandel, India was actually based on the great hammerhead, but to its absence he considered S. tudes as the proper name for this species, the small-eyed hammerhead, and considered S. bigelowi a junior synonym (following Tortonese, 1950a). Gilbert took the step of naming MNHN 1049 from Nice, France, as the lectotype of S. tudes and MNHN 1019 from Cayenne as its paralectotype to stabilize S. tudes but he may have achieved the opposite effect. Cadenat & Blache (1981), after examining the two Paris specimens, suggested that these in fact represented two species, the Cayenne specimen being conspecific with material of S. bigelowi Springer, but the designated lectotype from Nice is based on a fetus of S. couardi Cadenat, 1950! If this is correct and Gilbert's lectotype designation is followed, S. tudes must be considered a senior synonym of S. couardi and used for the whitefinned hammerhead, while S. bigelowi must be revived for the small-eyed hammerhead. This would not serve nomenclatorial stability, but an alternate solution, rejection of Gilbert's lectotype designation and redesignation of the Cayenne specimen as the lectotype of this species, would allow the retention of the present nomenclature: S. tudes for the western Atlantic small-eyed hammerhead and S. couardi for the eastern Atlantic whitefinned hammerhead. However, this would require a petition to the International Commission on Zoological Nomenclature and an Opinion by that body. The writer has not seen the syntypes in question and cannot confirm Cadenat & Blache's observations at present, so for this account Gilbert's arrangement is retained as a temporary expedient. The identity of the Nice specimen with S. couardi would explain why no specimens of the small-eyed hammerhead have been collected in the eastern Atlantic or Mediterranean Sea.

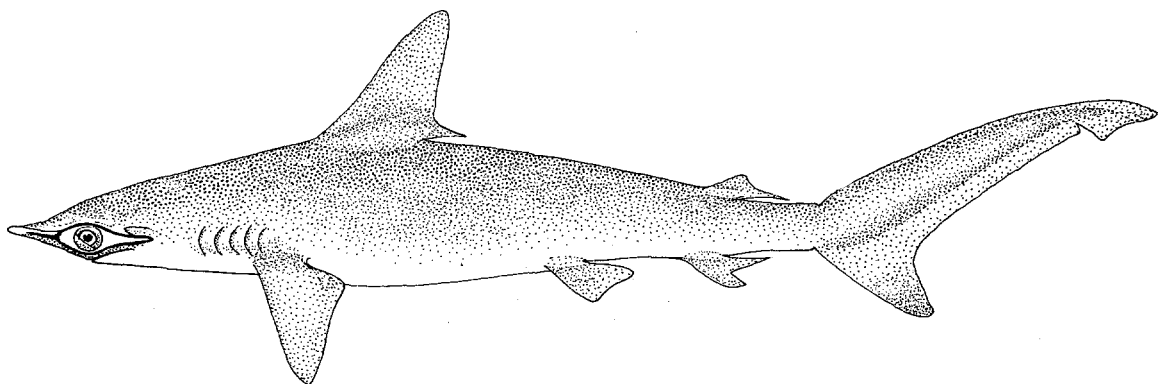
Sphyrna zygaena (Linnaeus, 1758)

SPHYRN Sphyrn 4

Squalus zygaena Linnaeus, 1758, Syst.Nat., ed. 10, 1:234. Holotype: None. Type Locality: "Habitat in Europa, America".

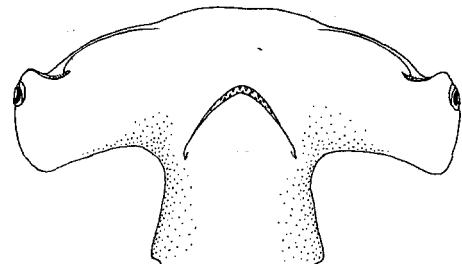
Synonymy : Squalus malleus Shaw & Nodder, 1796; ? Squalus (Cestrorhinus) caroliniensis Blainville, 1816 (nomen nudum); ? Squalus (Cestrorhinus) pictus Blainville, 1816 (nomen nudum); Zygaena vulgaris Cloquet, 1830; Zygaena subarcuata Storer, 1848.

FAO Names: En - Smooth hammerhead; Fr - Requin-marteau commun; Sp - Cornuda cruz.

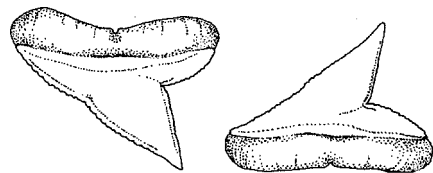


Field Marks : An easily recognized large hammerhead with a broad, narrow-bladed head, anterior margin of head broadly arched in adults and without a median indentation at any stage, teeth with very broad cusps and smooth to weakly serrated edge, moderately falcate first dorsal fin with free rear tip in front of pelvic origins, low second dorsal fin with weakly concave posterior margin and long inner margin about twice fin height, non-falcate pelvic fins, and a deeply notched posterior anal margin.

Diagnostic Features: Expanded prebranchial head hammer- or axe-shaped and very wide but longitudinally short, its width 26 to 29% of total length (mostly above 26%); distance from tip of snout to rear insertions of posterior margins of expanded blades less than half of head width; anterior margin of head very broadly arched with prominent lateral indentations, but no medial indentation; posterior margins of head wide, angled posterolaterally, and generally broader than mouth width; well-developed prenarial grooves present anteromedial to nostrils; preoral snout about 1/5 to less than 1/3 of head width; rear ends of eyes slightly behind upper symphysis of mouth; mouth rather broadly arched; anterior teeth with moderately long, very stout cusps, and smooth or weakly serrated edges, posterior teeth mostly cuspidate and not keeled and molariform. First dorsal moderately falcate, its origin over pectoral insertions, its free rear tip well anterior to pelvic origins; second dorsal fin low, less than anal height, with a shallowly concave posterior margin; its inner margin long, about twice fin height, and ending well in front of upper caudal origin; pelvic fins not falcate, with straight or slightly concave posterior margins; anal fin slightly larger than second dorsal fin and rather long, base 4.3 to 5.7% of total length; its origin slightly ahead of second dorsal origin, its posterior margin deeply notched. Total vertebral centra 193 to 206. A large hammerhead to over 3 m. Colour dark olive or dark grey-brown above, white below, undersides of pectoral fin tips dusky.

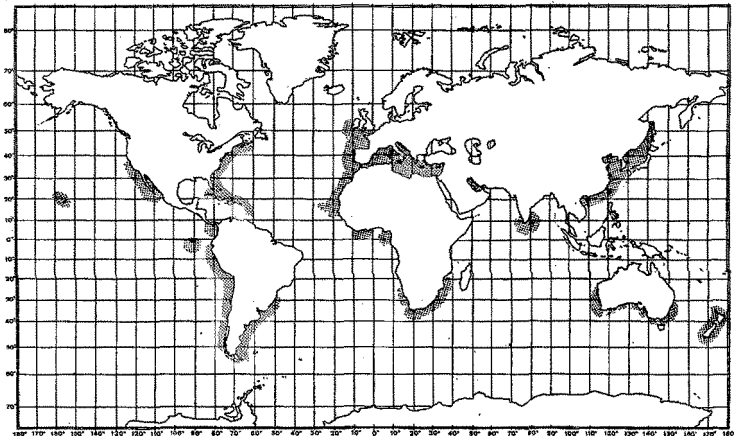


underside of head



upper and lower tooth

Geographical Distribution : Amphitemperate and tropical. Western Atlantic: Nova Scotia to Florida and Virgin Islands; southern Brazil to southern Argentina. Eastern North Atlantic: Mediterranean and British Isles to Senegal, Cape Verde Islands, Guinea, and Ivory Coast. Western Indian Ocean: South Africa and southern Mozambique, India and Sri Lanka. Western Pacific: Viet Nam (Gulf of Tonkin) to southern Japan and southern Siberia; Australia (New South Wales, Western Australia), New Zealand. Central Pacific: Hawaiian Islands. Eastern Pacific: Northern California to Gulf of California, Panama, Galapagos Islands, Ecuador to Chile.



Habitat and Biology: An active, common, coastal-pelagic and semi-oceanic hammerhead, found close inshore and in shallow water over the continental and insular shelves to offshore, at depths from the surface down to at least 20 m and probably much more. In the East China Sea, this hammerhead apparently occurs at or near the surface, while *S. mokarran* and *S. lewini* range into deeper water. This is apparently the hammerhead most tolerant of temperate waters, and has been thought to be only amphitemperate in its distribution; however, it definitely occurs in the tropics in places such as the Gulf of Mannar off southern India and Sri Lanka and off southern Mozambique, but its tropical range is spottily known at present due to probable confusion with the more abundant *S. lewini*. In some localities, such as off the eastern Cape of South Africa, it may occur in enormous migrating schools of young sharks 1.5 m or less long.

Viviparous, with a yolk-sac placenta; number of fetuses 29 to 37 per litter.

Feeds on a variety of bony fishes, including herring and menhaden, sea catfishes, sea bass, spanish mackerel, and porgies, and also small sharks, skates, stingrays, shrimp, crabs, barnacles, and squid and other cephalopods. Small sharks, skates and stingrays are especially favoured, and sharks are readily scavenged from nets and hooks. This species is regarded as being dangerous to people, though of the several attacks by large hammerheads only a few can be tentatively attributed to this species due to their occurrence in temperate waters. Off southern California, hammerheads apparently of this species have stolen catches from sportsfishermen and divers.

Size : Maximum about 370 to 400 cm, adults maturing at about 210 to 240 cm, adult males to at least 256 cm, adult females at least 304 cm; size at birth 50 to 61 cm.

Interest to Fisheries : A common to abundant species caught with pelagic longlines, handlines, and even pelagic and bottom trawls. It is utilized fresh, dried salted, and possibly smoked for human consumption; hides are processed for leather; liver oil is extracted for vitamins; fins are processed into shark fin soup base; and carcasses utilized for fishmeal.

Literature : Bigelow & Schroeder (1948); Garrick & Schultz (1963); Limbaugh (1963); Springer (1963); Randall (1963); Carvallo (1967); Gilbert (1967, a); Taniuchi (1974); Bass, D'Aubrey & Kistnasamy (1975a); Compagno (1979, 1981); Cadenat & Blache (1981).