Size : Maximum about 172 cm, possibly to 193 cm; males maturing between 110 and 130 cm and reaching at least 168 cm and possibly 193 cm; females mature at about 120 cm and reaching at least 172 cm; size at birth about 65 to 75 cm.

Interest to Fisheries : Probably relatively important to fisheries in some areas where it occurs (particularly off East Africa and in the Mauritius-Seychelles region where it is quite abundant); probably used fresh and dried salted for human consumption, and for fishmeal and other shark products.

Literature : Wheeler (1962); Bass, D'Aubrey & Kistnasamy (1973); Garrick (1982).

Remarks : This species was termed C. amblyrhynchus by Wheeler (1962) and C. spallanzani by Bass, D'Aubrey & Kistnasamy (1973), but was recently distinguished as a new species by Garrick (1982). It is very close to C. amblyrhynchos and may prove to be not distinct from that species.

Galeocerdo Müller & Henle, 1837

CARCH Gal

Genus : Galeocerdo Müller & Henle, 1837, Ber.Akad.Wiss.Berlin, 115.

Type Species : Squalus arcticus Faber, 1829, by subsequent monotypy in Bonaparte (1838:211).

Synonymy : Genus Boreogaleus Gill, 1862.

Diagnostic Features : Body fairly stout. Head broad and flat but not trowel-shaped; snout bluntly rounded or nearly truncate in dorsoventral view, very short, with preoral length about equal to internarial space and much less than mouth width; eyes fairly large, without posterior notches; large, slitlike spiracles present; no papillose gillrakers on internal gill openings; nostrils small, internarial space about 3 times the nostril width; anterior nasal flaps short, broadly triangular, and not tubular; labial furrows very long, with uppers over twice as long as lowers and nearly reaching anterior ends of eyes; teeth similar in upper and lower jaws, of characteristic cockscomb shape, with heavy, bent, oblique cusps, strong distal cusplets and prominent serrations but no blades; cusps of lower teeth not prominently protruding when mouth is closed; 18 to 26/18 to 25 rows of teeth; interdorsal ridge present and very prominent; low but prominent dermal keels present on caudal peduncle; upper precaudal pit transverse and crescentic. First dorsal origin above pectoral insertions or inner margins, its midbase closer to pectoral bases than to pelvics, and free rear tip well in front of pelvic fins; second dorsal fin much smaller than first, its height about 2/5 of first dorsal height or less; its origin slightly anterior to anal origin; pectoral fin moderately broad and semifalcate, pectoral length from origin to free rear tip about 3/5 to 2/3 of their anterior margins; pectoral origins under interspace between third and fourth gill slits; anal fin about as large as second dorsal, with short preanal ridges and a deeply notched posterior margin. Colour grey with a unique colour pattern of black spots and vertical bars on dorsal surface of body, bold in young but fading out in adults. Gigantic sharks, up to 6 and possibly 7.5 m.

Remarks : Japanese writers, including Matsubara (1955) and Shiino (1972) often recognize two species of Galeocerdo, G. cuvier and G. rayneri McDonald & Barron, 1868. Pending confirmation of the validity of G. rayneri the writer prefers to include it in synonymy of G. cuvier (see also Compagno, 1979).

Galeocerdo cuvier (Peron & LeSueur, 1822)

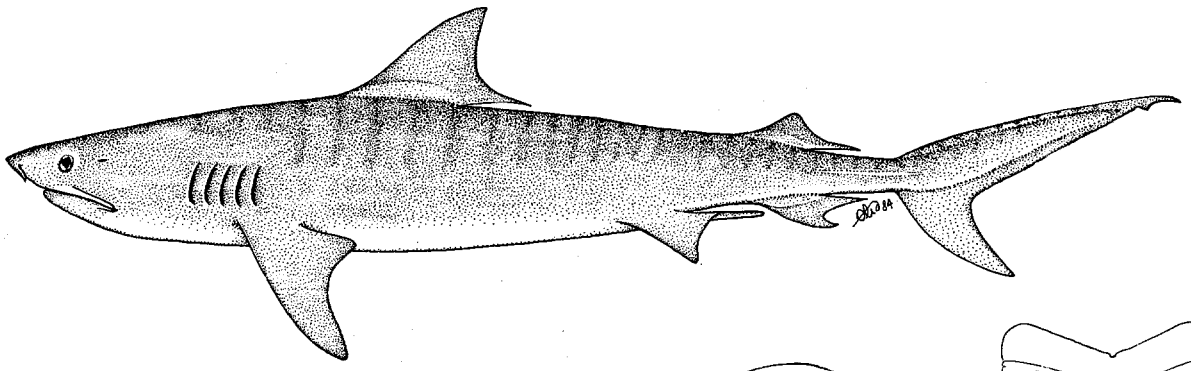
CARCH Gal 1

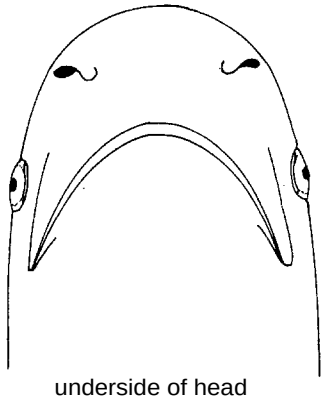
Squalus cuvier Peron & LeSueur, in LeSueur, 1822, J.Acad.Nat.Sci.Philad., 2(2):351. Holotype: None. Type Locality: Northwest coast of New Holland (Australia).

Synonymy : Squalus arcticus Faber, 1829; Galeus cepedianus Agassiz, 1838; Galeocerdo tigrinus Müller & Henle, 1839; Galeus maculatus Ranzani, 1840; Carcharias (Prionodon) fasciatus Bleeker, 1852 in part, also based on Carcharhinus dussumieri); Galeocerdo rayneri McDonald & Barron, 1868; Galeocerdo obtusus Klunzinger, 1871; Carcharias hemprichii Hilgendorf in Hemprich & Ehrenberg, 1899.

Other Scientific Names Recently in Use : Galeocerdo arcticus (Faber, 1829).

FAO Names: En - Tiger shark; Fr - Requin tigre commun; Sp - Tintorera.





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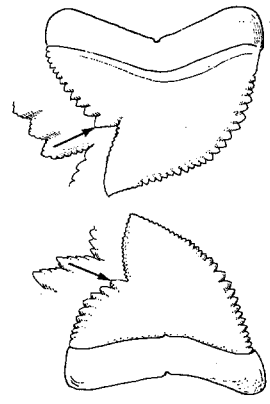
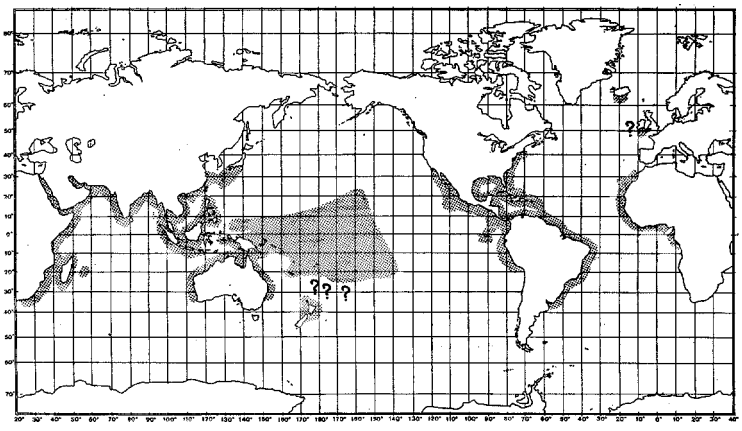


upper and lower tooth

Field Marks: A big-headed, very short and blunt-snouted, large-mouthed requiem shark with a rather slender body behind the pectoral fins, long upper labial furrows that reach the eyes, large spiracles, cockscomb-shaped curved teeth with heavy serrations and distal cusplets, low keels on caudal peduncle, a slender caudal fin with an acutely pointed tip, and characteristic dark, vertical tiger-stripe markings, faded or obsolete in adults.

Diagnostic Features: See genus.



Geographical Distribution : Circum-global in temperate and tropical seas. Western Atlantic: Massachusetts, USA to Uruguay, including Gulf of Mexico and Caribbean islands. Eastern North Atlantic: Iceland and possibly UK (presumably as a vagrant that followed the Gulf Stream north-ward and so crossed the Atlantic), Morocco and Canary Islands, Senegal, Gambia, Guinea, Ivory Coast, and Ghana, but probably more wide-ranging in the area, from Morocco to Angola. Indo-West Pacific: South Africa north to the Red Sea and east to Pakistan, India, Sri Lanka, Thailand, Viet Nam, southern China (including Taiwan Province), Japan, the Philippines, Indonesia, Australia (northern, western and southern Australia, New South Wales), New Zealand, New Caledonia. Western central Pacific: Palau east to Solomon, Marshall and Hawaiian Islands, as well as Tahiti (French Polynesia). Eastern Pacific: Southern California to Peru, Cocos, Galapagos, Revillagigedo Islands.

Habitat and Biology : A common, wide-ranging coastal-pelagic tropical and warm-temperate shark, with a wide tolerance for different marine habitats, on or adjacent to the continental and insular shelves at depths from the surface and intertidal to possibly 140 m. It seems to prefer turbid areas in continental waters, large island groups or high volcanic islands where high runoff of fresh water may contribute to a high density of prey organisms. It often occurs in river estuaries, close inshore off wharves and jetties in harbours, and in coral atolls and lagoons. It is also known to make excursions far offshore, in the open ocean, but is not a truely oceanic species like Prionace and certain Carcharhinus. It does occur off oceanic islands far from other islands and continental land masses, and probably is capable of long oceanic voyages between islands.

The tiger shark is apparently nocturnal, and shows a localized diel cycle of movement inshore at night into shallow bays, estuaries, passes between islands, lagoons, and other shallow areas sometimes barely deep enough to swim in. By day the sharks retreat to deeper water off reefs and in deeper areas of bays and lagoons where they remain until nightfall. During the day, smaller tiger sharks may be more active, less timid in light, and less reluctant to approach the surface than large ones, though all sizes come to the surface at night. Although tiger sharks may form aggregations, especially when feeding, the species may be more often solitary.

Adults and subadult tiger sharks may be resident or semi-resident around oceanic islands, with movement by some individuals into or out of the area. With depletion of a resident population around such islands, smaller individuals will gradually recolonize them, probably by swimming across the open ocean. Seasonal movements have been noted for continental waters.

The tiger shark is an active, strong-swimming shark, ordinarily seen cruising slowly with a sinuous motion that has been described as 'sluggish'. When attacking or fleeing it becomes highly active, and is capable of bursts of high-speed swimming. It can be kept in aquaria, but usually does not last more than a few months.

This is the only ovoviviparous carcharhinid, but it is uncertain whether ovovivipary is primitive in the tiger shark or due to loss of the vitelline placenta. The related Hemigaleidae, the apparent sister group of the Carcharhinidae, has vivipary (placentovivipary), suggesting that the condition in the tiger shark is secondary. Pupping is reported in spring and early summer, April to June in the Northern Hemisphere, and probably November to January in the Southern. Size of litters very large, 10 to 82. The gestation period may be slightly over a year. In the Northern Hemisphere, mating may occur in the spring. This species may mature at between 4 to 6 years old and live to at least 12 years.

The tiger shark is perhaps the least specialized of sharks as far as feeding is concerned. It eats a wide variety of marine life as well as being somewhat of a 'garbage-can with fins' in its taking of carrion and all manner of inedible objects. The tiger shark is a 'sea hyena', a potent predator-scavenger that opportunistically exploits its environment. It takes a wide variety of bony fishes, including tarpon, ten-pounders, eels, sea catfish, mullet, wrasses, parrotfish, goatfish, jacks, mackeral, tongue-soles, flatheads, flying gurnards, batfish, triggerfish, porcupine fishes, boxfish, and puffers. Elasmobranch prey includes many other species of sharks, including bramble sharks, spiny dogfish, sawsharks, angel sharks, bullhead sharks, grey sharks, sharpnose sharks, hammer-heads, and even other tiger sharks, as well as guitarfishes, skates, whiptail and round stingrays, butterfly rays, mantas and spotted eagle rays. It is thought by at least one writer (S. Springer) that large tiger sharks cannot readily take uninjured small sharks and bony fishes, but are extremely opportunistic in attacking hooked and netted fishes, including other sharks, and are somewhat of a problem to shark fisheries in the tropics because they do this more than other species of large sharks. However, they often manage to hook themselves after eating hooked fishes. This shark takes marine reptiles more than any other species, and frequently preys on sea turtles (green, loggerhead and ridley turtles) and is one of the most important predators on sea snakes. Presumably Galapagos marine iguanas are eaten by the tiger shark, and in one instance a large green iguana was found in a tiger shark's stomach. Sea birds, including shearwaters, frigate birds, cormorants and pelicans, are taken, along with migrating land birds that fall into the water. Marine mammals taken by the tiger shark include sea lions, fur seals, monk seals, dolphins, possibly porpoises, and meat from a small baleen whale (probably taken as carrion); pinnipeds are apparently killed by the sharks, though cetaceans may be more readily taken as carrion. Invertebrate prey, including octopi, squid, cuttlefish, spiny lobsters, crabs, horseshoe crabs, conchs and other marine gastropods, tunicates, and even jellyfish, is, readily eaten, and tiger sharks have been found gorged with lobsters, horseshoe crabs and conchs. Carrion from terrestrial birds and mammals is commonly devoured, including that from dead chickens, rats, pigs, cattles, sheep, donkeys, dogs, hyenas, monkeys, and humans. Apart from people definitely known to be killed and eaten by tiger sharks, some of the other terrestrial vertebrates found in tiger shark stomachs may have been taken alive as well as in the form of carrion. These may become vulnerable to tiger sharks when they swim across estuaries or other bodies of water inhabited by these sharks, or when they fall or are tossed off of ships. The tiger shark is famed for swallowing an incredible variety of floating and bottom junk of human activity and natural sources, including leather, fabrics, pieces of coal and wood, seeds and other vegetable material, feathers, plastic bags, burlap bags, small barrels, cans, pieces of metal, etc.

The tiger shark is one of the most dangerous sharks, with more confirmed attacks on divers and swimmers (including multiple attacks) and attacks on boats being recorded for this species than all other sharks except the great white shark. Because most shark attacks occur in the tropics, where this species and other dangerous requiem sharks abound, this and other dangerous carcharhinids may actually be responsible for many more attacks than the far more notorious white shark. The tiger shark can be inquisitive and aggressive underwater, and may approach humans closely. In more than one instance tiger sharks have attacked divers while they were spearfishing or attracting sharks for photography, and had to be dissuaded by prompt aggressive action. An underwater encounter with this shark may not necessarily result in an attack, and may not result in an attack in most instances, but the species should be regarded with extreme caution because of its broad prey spectrum and lack of reluctance in eating unusual items. Certainly the tiger shark has the worst reputation as a man-eater amongst tropical sharks, and in part this may be deserved. In the West Indies and French Polynesia the tiger shark is considered the most dangerous of local sharks.

Size : Maximum reputed to be about 9.1 m, but this cannot be confirmed. Most tiger sharks are smaller than 5 m, with only a few large females reaching over 5.5 m. Males mature between 226 and 290 cm and reaching at least 370 cm; females maturing between 250 and 350 cm and reaching over 55 m, though most do not exceed 4.3 m; one gigantic adult female caught off Indo-China in 1957 was reported as being 740 cm long and weighing 3110 kg (Fourmanoir, 1961). Size at birth between 51 and 76 cm.

Interest to Fisheries: The tiger shark is commonly caught in coastal and offshore fisheries with longlines, hook-and-line, and fixed bottom nets as well as other gear. Its meat is utilized fresh, fresh frozen, dried salted and smoked for human consumption; its hide is of high quality and is used for leather and other products; its fins are used for shark fin soup base; and its liver, which often has a high vitamin potency, is processed for vitamin

oil. This shark is fished by sports anglers and caught with rod and reel; it is one of the sharks recognized as a big-game fish by the International Game Fish Association and is currently the second largest all-tackle record fish taken by rod and reel after the great white shark.

Literature : Beebe & Tee-Van (1941), Fowler (1941); Bigelow & Schroeder (1948); Gudger (1949); Baughman & Springer (1950); Kauffman (1950); Cadenat (1957); Fourmanoir (1961); Garrick & Schultz (1963); Randall (1963); Gohar & Mazhar (1964); Springer (1960, 1963), Clark & von Schmidt (1965); Bass, D'Aubrey & Kistnasamy (1975b); Johnson (1978); Compagno & Vergara (1978); Compagno (1979, 1981); Cadenat & Blache (1981); Van der Elst (1981).

Glyphis Agassiz, 1843

CARCH Glyph

Genus: Glyphis Agassiz, 1843, Poiss.Foss., 3:243.

Type Species: Carcharias (Prionodon) glyphis Müller & Henle, 1839, by absolute tautonymy (see discussion below).

Synonymy: None.

Field Marks : Requiem sharks with short, broadly rounded snouts, small, wide-spaced nostrils, no spiracles, labial furrows confined to mouth corners, extremely small eyes, serrated triangular, broad-cusped upper teeth, no cusplets on lower teeth (except for first few anterolaterals in G. gangeticus), no keels on caudal peduncle, conspicuously protruding cusps on lower teeth, longitudinal precaudal pits, first dorsal midbase much closer to pectoral bases than pelvics, second dorsal fin half to 3/5 height of first, second dorsal origin slightly in front of anal origin, anal fin with preanal ridges virtually absent and with a deeply notched posterior margin.

Diagnostic Features: Body fairly stout. Head broad and flattened but not trowel-shaped; snout broadly parabolic or rounded in dorsoventral view and short, with the preoral length varying from about equal or somewhat less than internarial space but much less than mouth width; eyes extremely small, without posterior notches; spiracles absent; no papillose gillrakers on internal gill openings; nostrils small, internarial space 3 to 6 times the nostril width; anterior nasal flaps short, broadly to narrowly triangular, but not tubular; labial furrows short, essentially confined to mouth corners, with uppers shorter than lowers and falling far behind eyes; teeth strongly differentiated in upper and lower jaws; upper anteroposteriors with more or less erect, broad, triangular cusps, no cusplets or blades, and fine serrations; lowers with or without cusplets (on first few anterior teeth) or blades but with variably oblique to erect, long cusps and with serrations generally absent; cusps of lower teeth prominently protruding when mouth is closed; 29 to 37/28 to 34 rows of teeth. Interdorsal ridge absent; no lateral keels on caudal peduncle; upper precaudal pit longitudinal and not crescentic. First dorsal origin far anterior, over last thirds of pectoral bases, midbase much closer to pectoral bases than to pelvics and free rear tip well in front of pelvic fins; second dorsal fin much smaller than first but relatively large, its height 1/2 to 3/5 of first dorsal height or less, its origin slightly anterior to anal origin; pectoral fins moderately broad and falcate or semifalcate, their lengths from origin to free rear tip about 3/5 to nearly 3/4 of pectoral anterior margins; pectoral origins varying from about under interspace between third and fourth gill slits to under fourth gill slits; anal fin slightly smaller than second dorsal, with preanal ridges very short or absent and a deeply notched posterior margin. Colour grey or brownish above, without a colour pattern. Large sharks, to at least 2 m.

Remarks: The genus Glyphis is used here for the 'river sharks', two and possibly three or more species of poorly known, freshwater and estuarine sharks of the Indian Ocean and Western Pacific. This includes the famous, notorious, and elusive Ganges shark (G. gangeticus) of Indian waters.

The nomenclatural history of the genus Glyphis is somewhat checkered. Agassiz (1843) based his description of the genus primarily on a living species, Carcharias (Prionodon) glyphis Müller & Henle, 1839, which he mentioned in its text, but also named a new fossil species, G. hastalis. Elsewhere in the Poissons Fossils Agassiz (vol. 3, 1845, tab.mat.3e: 7) noted that Glyphis included "une espéce vivante et une fossil de l'Argile de Londres, le G. hastalis". Agassiz did not designate a type for Glyphis, but this must be C. (P.) glyphis by absolute tautonymy.

Fowler (1941) and Bigelow & Schroeder (1948) assumed that Glyphis as originally described by Agassiz included only a single species, G. hastalis, which they erroneously assumed was the type species by monotypy. Bigelow & Schroeder (1948) cited 1838 as the earliest date for Glyphis, on a plate caption for G. hastalis (Agassiz, Poissons Fossils, Atlas, vol. 3, pl. 36). However, according to Woodward & Sherborn (1890) the plate in question was apparently published in 1845 and hence postdates the text description of Glyphis.

Fowler (1928, 1941) erroneously used Glyphis to replace Prionace Cantor, 1849, as a generic name for the blue shark, P. glauca (Linnaeus, 1758). Apart from the subsequent stabilization of Prionace as the generic name of the blue shark by the International Commission on Zoological Nomenclature (Opinion 723, 1965) and confusion on the type species of Glyphis, this action is unwarranted because neither the living type species of Glyphis or the fossil G. hastalis are congeneric with the blue shark.

Garrick (1982) excluded Carcharias (Prionodon) glyphis and C. (P.) gangeticus Müller & Henle, 1839 from the genus Carcharhinus, but did not place them in a given genus. He noted that these two species "....share many similarities with each other and differ less from Carcharhinus than does temmincki". Extending Garrick's conclusions requires that the genus Glyphis be expanded to include C. (P.) gangeticus as well as C. (P.) glyphis and G. hastalis. The genus Lamiopsis, as recognized here and in Compagno (1979) for C. (P.) temmincki Müller & Henle, 1839, is close to Glyphis but readily distinguishable from it and from Carcharhinus.

Garrick (pers. comm.) notes that there may be at least one additional living species in this genus, similar to G. glyphis but separable by vertebral counts and possibly other characters.

Key to Species

1a. First few anterior teeth in lower jaw with entire smooth cutting edges and low cusplets on the crown foot. Second dorsal fin lower, about half height of first dorsal ..... **G. gangeticus**

1b. First few anterior teeth in lower jaw with cutting edges confined to tips of cusps, giving cusps a spearlike shape, and no cusplets. Second dorsal higher, about 3/5 height of first dorsal ..... **G. glyphis**

Glyphis gangeticus (Müller & Henle, 1839)

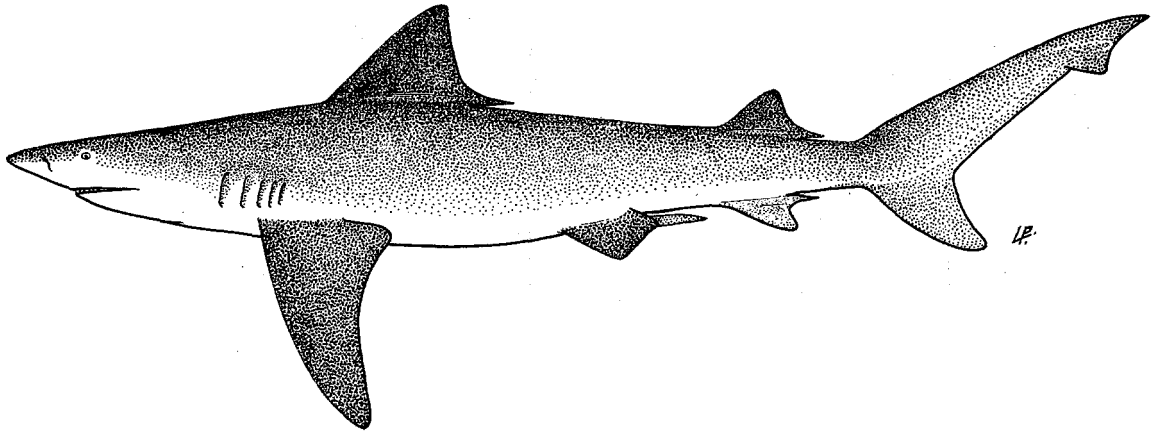
CARCH Glyph 1

Carcharias (Prionodon) gangeticus Müller & Henle, 1839, Syst.Beschr.Plagiost., (2):39, pl. 13. Syntypes : A stuffed adult or late adolescent male about 1780 mm long in the Zoologisches Museum, Humboldt Universitat, Berlin apparently lost, and an alcohol-preserved specimen in the Museum National d'Histoire Naturelle, MNHN 1144, 564 mm long. Type Locality: "Im Ganges, 60 Stunden oberhalb des Meers bei Houghly gefangen".

Synonymy : ? Carcharias murrayi Günther, 1887.

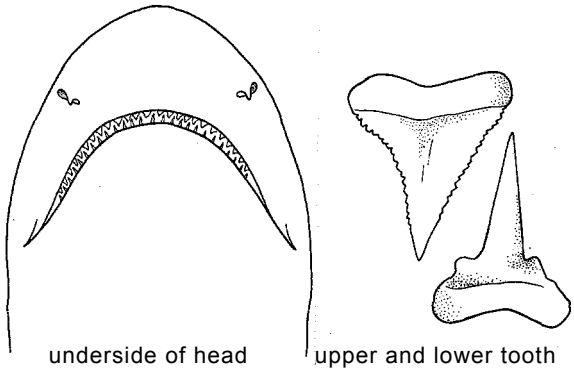
Other Scientific Names Recently in Use : Carcharhinus gangeticus (Müller & Henle, 1839); Eulamia gangetica (Müller & Henle, 1839); Platypodon gangeticus Müller & Henle, 1839).

FAO Names : En - Ganges shark; Fr - Requin du Ganges; Sp - Tiburón del Ganges.



Field Marks: A fairly stocky requiem shark with a broadly rounded short snout, preoral snout much shorter than mouth width but with a rather long preorbital snout, minute eyes, first dorsal origin over rear ends of pectoral bases, second dorsal rather large, about 1/2 height of first dorsal, upper teeth with high, broad, serrated triangular cusps, lower anterior teeth with long, hooked, protruding cusps having unserrated cutting edges not confined to spearlike tips and crown feet with low cusplets, no interdorsal ridge, upper precaudal pit longitudinal, no conspicuous markings.

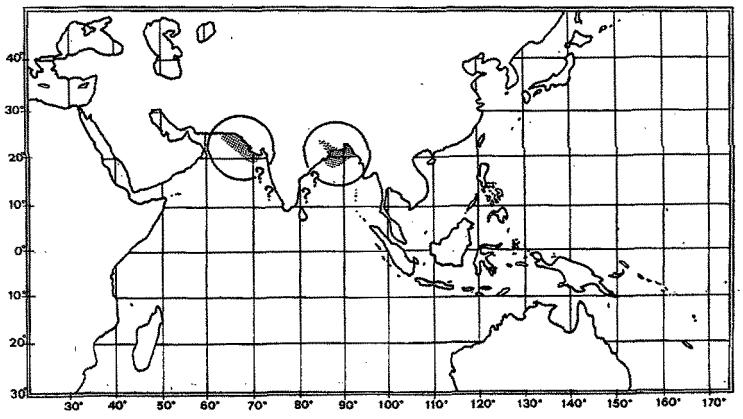
Diagnostic Features: First few anterior teeth in lower jaw with cutting edges along entire cusp, giving the cusps a clawlike shape, and low cusplets; second dorsal lower, about half the height of first dorsal.



underside of head

upper and lower tooth

Geographical Distribution : Indo-West Pacific: Definitely known from the Hooghly River, Ganges system, West Bengal, India, and likely from the vicinity of Karachi, Pakistan (see remarks below).



Habitat and Biology : A poorly known freshwater riverine and possibly inshore marine and estuarine shark. Probably viviparous. The Ganges shark has a horrific reputation as a maneater in the Ganges-Hooghly system, but this is unproven (see remarks below).

Size : Maximum possibly to at least 204 cm (type of Carcharias murrayi); adult or adolescent male 178 cm (stuffed syntype); newborn specimens 56 to 61 cm.

Interest to Fisheries : Probably fished in the Ganges-Hooghly system, but details unknown.

Literature : Fowler (1941); Garrick & Schultz (1963); Boeseman (1964); Garrick (1967, 1982, pers. comm.); Budker & Whitehead (1972); Bass, D'Aubrey & Kistnasamy (1973).

Remarks : The elusive Ganges shark has been famed and fabled for its occurrence in fresh water as well as for its bloody reputation as a maneater there. Originally known only from the type locality, it was gradually recorded from the entire span of the Indo-West Pacific until Fowler (1941), in a masterpiece of compilation bearing little relationship to reality, recorded the species from Arabia and India to Borneo, Viet Nam, China, Japan, Australia, the Philippines, and Fiji and the Hawaiian Islands. However, with the critical survey of carcharhinids begun in the early 1960s, most of the marine and freshwater records of the Ganges shark could not be substantiated and many were found to be based on Carcharhinus leucas, C. amboinensis and other species (see Garrick & Schultz, 1963; Boeseman, 1964; Garrick, 1967, 1982; Bass, D'Aubrey & Kistnasamy (1973). Boeseman (1964) noted that "most of the recorded C. gangeticus from outside the Indo-Pakistan Peninsula (excepting those from Japan and possibly, from Viti-Levu, Fiji Islands), are identical with C. leucas Müller & Henle.", and since then confirmation of records of the species from Japan and Fiji has not been forthcoming. Lineaweaver & Backus (1970) and Ellis (1975, 1983) even considered the Ganges shark a synonym of Carcharhinus leucas, although Garrick (1982) recognized it as distinct.

During a trip to India in 1982 the writer discovered an additional specimen of G. gangeticus in the fish collection of the Zoological Survey of India in Calcutta (ZSI 8067, 61 cm newborn female, misidentified as Carcharhinus temmincki), collected by Or J. Anderson from the Hooghly River on 4 April 1867. This confirmed Garrick's recognition of the species, but sheds little additional light on its biology. It is apparently only the fourth verified specimen of this rare shark, including the two syntypes (one lost) and possibly the holotype of Carcharias murrayi (also lost), and hence is one of two extant specimens in museum collections. Garrick (1982) suggested that Carcharias murrayi is a possible synonym: of this species, with which the writer concurs.

The writer examined another specimen in the Zoological Survey collections labelled Squalus gangeticus (ZSI 10250, 65 cm newborn male) but bearing the same data (Hooghly River, collected by Dr J. Anderson, 4 April 1867) as the true gangeticus specimen; but this turned out to be the circumtropical bull shark, Carcharhinus leucas. Although Garrick (1982) had not examined specimens of leucas from the Indian subcontinent, the writer found leucas material from Cochin and Bombay as well as the Hooghly specimen.

Thus there are two species of sharks in the Hooghly River, and, with the well-known affinities of C. leucas for fresh water, probably two Ganges River sharks as well. The hideous reputation of the true Ganges shark grew on the assumption that there was only one species of shark in fresh water in the Hooghly-Ganges system, which was responsible for the numerous attacks on people reported by Day (1878) and other writers. However, the Ganges shark may eventually have to pass on much or all of its notoriety to the more prosaic but perhaps more dangerous and formidable bull shark. In comparison with Carcharhinus leucas, Glyphis gangeticus has much narrower, higher, upper teeth and slender-cusped, less heavily built lower teeth. The teeth of the Ganges shark appear more suitable for fish-impaling and. less useful for dismembering tough mammalian prey than the very stout teeth of the bull shark. The presence of the bull shark (one of the most dangerous living species) in the Hooghly and perhaps the Ganges along with readily available human prey and mammalian carrion suggests that with widespread confusion of this shark and C. leucas in India and elsewhere its bad reputation must be considered uncertain at best. The Ganges shark is potentially dangerous because of its size and large teeth, but at present its relation to humans is a mystery, along with almost all other aspects of its biology. Although sharks are currently caught in the Ganges system (P.K. Talwar, pers. comm.), it is not known how common the true Ganges shark is relative to the bull shark. It is also quite uncertain how well the Ganges shark is adapted to fresh water, or for that matter, how well it can live in sea water. The presence of newborn individuals in the Hooghly River suggests that at least the young may be born in fresh water. The minute eyes of the Ganges shark, along with other Glyphis sharks, suggests that the entire group may be adapted to turbid water with poor visibility, as in large tropical rivers and muddy estuaries.

Glyphis glyphis (Müller & Henle, 1839)

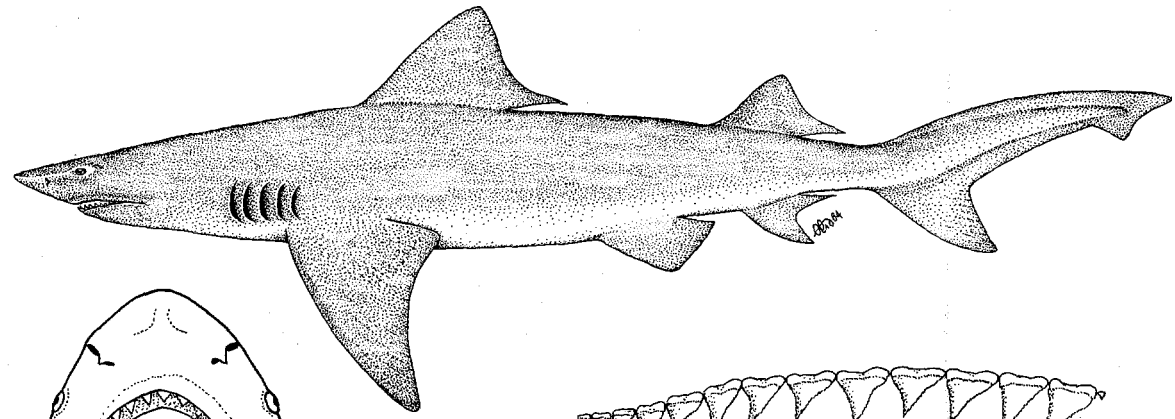
CARCH Glyph 2

Carcharias (Prionodon) glyphis Müller & Henle, 1839, Syst.Beschr.Plagiost., (2):40, pl. 14. Holotype: About 1 m long, stuffed specimen in Zoologisches Museum, Humboldt Universitat, Berlin. Type Locality: Unknown.

Synonymy : None.

Other Scientific Names Recently in Use : Carcharhinus glyphis (Müller & Henle, 1839).

FAO Names : En - Speartooth shark; Fr -. Requin lancette; Sp - Tiburón lanza.



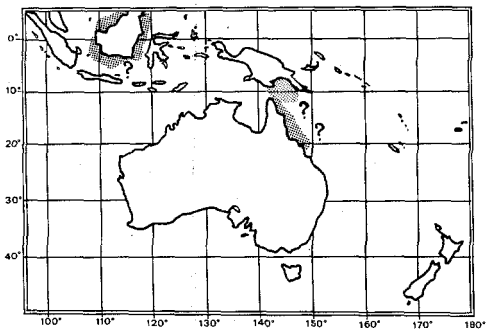
underside of head

upper and lower teeth
from right side

Field Marks: A stocky requiem shark with a broadly rounded short snout, preoral snout much shorter than mouth width but preorbital snout rather long, minute eyes, first dorsal origin over rear ends of pectoral bases, second dorsal rather large, about 3/5 height of first dorsal, upper teeth with high, broad, serrated triangular cusps, lower anterior teeth with long, hooked, protruding cusps with unserrated cutting edges confined to slightly expanded spearlike tips, no interdorsal ridge, upper precaudal pit longitudinal, no conspicuous markings.

Diagnostic Features : First few anterior teeth in lower jaw with cutting edges confined to tips of cusps, giving the cusps a spearlike shape, and no cusplets. Second dorsal higher, about 3/5 height of first dorsal.

Geographical Distribution : Uncertain. G. glyphis-like sharks occur in Borneo, New Guinea, and Queensland, Australia, but it is uncertain at present if any of these are the true G. glyphis (see remarks below).



Habitat and Biology : Presumably inshore and possibly in fresh water. Biology unknown.

Size : Maximum at least 1 m; this or a related species in New Guinea may reach 2 to 3 m.

Interest to Fisheries : Unknown.

Literature : Garrick (1982, and pers. comm.).

Remarks : This mysterious, apparently rare shark was long known only from Müller & Henle's (1839) original account. Prof. J.A.F. Garrick (pers. comm.) has obtained additional specimens of glyphis-like sharks from New Guinea, Borneo and Queensland, Australia. However, these may represent more than one species, as the Borneo and New Guinean specimens differ significantly in vertebral counts, and it is uncertain at present which of these (if any) represent the true G. glyphis. This problem is under study by Prof Garrick and the writer.

Isogomphodon Gill, 1862

CARCH Iso

Genus: Isogomphodon Gill, 1862, Ann.Lyceum Nat.Hist.N.Y., 7:401.

Type Species : Carcharias (Prionodon) oxyrhynchus Müller & Henle, 1839, by original designation.

Synonymy : None.

Diagnostic Features : Body fairly stout. Head narrow and flattened but not trowel-shaped; snout acutely triangular or subtriangular in dorsoventral view and very long, with preoral length much greater than internarial space and mouth width; eyes extremely small, without posterior notches; spiracles absent; no papillose gillrakers on internal gill openings; nostrils small, internarial space about 3 times the nostril width; anterior nasal flaps vestigial, not tubular; labial furrows short but prominent, essentially confined to mouth corners, with uppers about equal to lowers and with their anterior ends falling far behind eyes; teeth not strongly differentiated in upper and lower jaws, anteroposteriors with more or less erect, narrow acute cusps, no cusplets, and proximal and distal blades; uppers with slightly broader flatter cusps and serrations; lowers with slenderer cusps and smooth edges; cusps of lower teeth not protruding when mouth is closed; 49 to 60/49 to 56 rows of teeth. Interdorsal ridge absent; no lateral keels on caudal peduncle; upper precaudal pit transverse and crescentic. First dorsal origin far forward, over midbase or second third of pectoral bases, its midbase much closer to pectoral bases than to pelvics and free rear tip well anterior to pelvic fin origins; second dorsal fin considerably smaller than first but rather large, its height about 1/2 of first dorsal height, its origin slightly anterior or opposite anal origin; pectoral fins broad and triangular, their lengths from origin to free rear tip about 3/4 of pectoral anterior margins; pectoral origins about under 5th gill slit; anal fin somewhat smaller than second dorsal, with preanal ridges very short and a deeply notched posterior margin. Colour grey or brownish above, without a colour pattern. Moderate-sized sharks, adults probably not exceeding 1.6 m.

Remarks : The genus Isogomphodon was until recently synonymized with Carcharhinus (see Bigelow & Schroeder, 1948; Garrick & Schultz, 1963; Garrick, 1967). However, Springer 1950 resurrected it and Compagno (1970, 1979) and Compagno & Vergara (1978) resurrected it a second time, and Compagno (1979) gave a taxonomic history of the genus and a detailed review of its relationships. Garrick (1982) excluded the single species included in Isogomphodon, Carcharias (Prionodon) oxyrhynchus Müller & Henle, 1839, from Carcharhinus.

Isogomphodon oxyrhynchus (Müller & Henle, 1839)

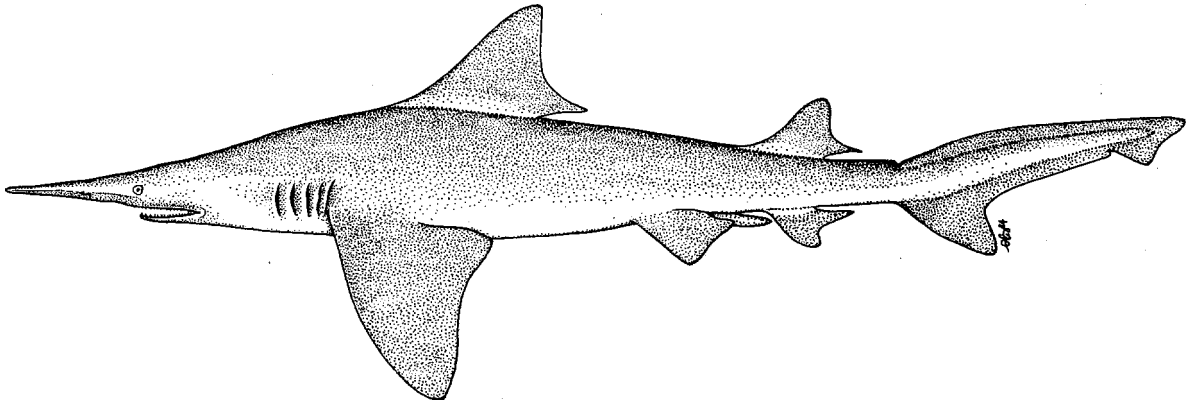
CARCH Iso 1

Carcharias (Prionodon) oxyrhynchus Müller & Henle, 1839, Syst.Beschr.Plagiost. (2):41, pl. 15. Syntypes: Rijksmuseum van Natuurlijke Historie, Leiden. Type Locality: Surinam.

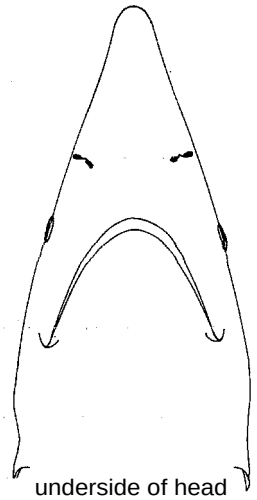
Synonymy : None.

Other Scientific Names Recently in Use : Carcharhinus oxyrhynchus (Müller & Henle, 1839)

FAO Names: En - Daggernose shark; Fr - Requin bécune; Sp - Cazón picudo.



Field Marks: An unmistakable requiem shark, with an extremely long, flattened, acutely pointed, triangular snout, minute circular eyes with nictitating eyelids, very large, paddle-shaped pectoral fins, the first dorsal fin with its origin over the pectoral fins, narrow, erect-cusped small teeth, without cusplets, in both jaws, upper teeth serrated, and over 45 rows of teeth in both jaws, and colour grey or yellow-grey above and white below, without prominent markings. This shark bears a superficial resemblance to rhinochimaerids, the goblin shark (Mitsukurina) and certain undescribed species of the scyliorhinid genus Apristurus, all of which have similar long snouts.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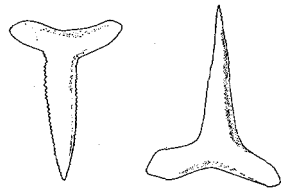
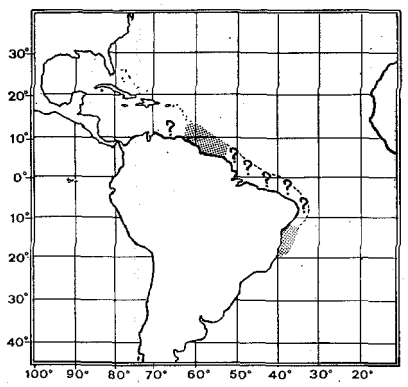

upper and lower teeth

Diagnostic Features: See genus.

Geographical Distribution : Western Atlantic: Trinidad, Guayana, Surinam, French Guinea, probably central Brazil (Valenca, Bahia).



Habitat and Biology : A bizarre, little-known, inshore tropical shark of continental waters of Atlantic South America. Described as commonly frequenting estuaries and river mouths, and occurring over rocky bottoms.

This is a viviparous species, with a yolk-sac placenta; number of young recorded as 4 per litter.

The daggernose shark feeds on small schooling fishes including herring, anchovies and croakers, for which its long jaws and small, spikelike teeth are very well suited. Its small eyes and very tong snout may be adaptations for feeding in turbid water, emphasizing rostral sense organs over sight.

This shark is not known to be dangerous to people, and its small teeth and small size suggest that it is an innocuous fish-eater.

Size : Maximum said to be about 200 to 244 cm, but not verified above 152 cm, males adolescent at about 96 cm and adult at 108 cm; size at birth about 38 to 41 cm.

Interest to Fisheries : Limited, apparently taken in small numbers by local fishermen in Trinidad, the Guayanas, and apparently central Brazil, where it is an incidental bycatch of other fisheries. Caught in fixed bottom gillnets and longlines. Occasionally marketed, but not considered a prime food fish.

Literature : Bigelow & Schroeder (1948); Compagno (1970, 1979); Cervigon (1971); Compagno & Vergara (1978); Cadenat & Blache (1981); S. Springer (pers. comm.); J.C. Cordell (pers. comm.).

Lamiopsis Gill, 1862

CARCH Lamio

Genus: Lamiopsis Gill, 1862, Ann.Lyceum Nat.Hist.New York, 7:401.

Type Species : Carcharias (Prionodon) temmincki, Müller & Henle, 1839, by original designation.

Synonymy : None.

Diagnostic Features: Body fairly stout. Head broad and flattened but not trowel-shaped; snout broadly parabolic in dorsoventral view and moderately long, with preoral length considerably greater than internarial space and nearly equal to mouth width; eyes fairly small, without posterior notches; spiracles absent; no papillose gillrakers on internal gill openings; nostrils small, internarial space about 3 times the nostril width; anterior nasal flaps short, broadly triangular, but not tubular; labial furrows short, essentially confined to mouth corners, with uppers shorter than lowers and falling far behind eyes; teeth strongly differentiated in upper and lower jaws; upper anteroposteriors with more or less erect, broad, triangular cusps, no cusplets or blades, and serrations; lowers without cusplets but with variably oblique to erect, long hooked cusps and with serrations absent; cusps of lower teeth slightly protruding when mouth is closed; 29 to 37/28 to 34 rows of teeth. Interdorsal ridge absent; no lateral keels on caudal peduncle; upper precaudal pit longitudinal and not crescentic. First dorsal origin over pectoral inner margins, its midbase slightly closer to pectoral bases than to pelvics and free rear tip slightly anterior, over, or slightly posterior to pelvic fin origins; second dorsal fin nearly as large as first, its height 3/4 or more of first dorsal height; its origin about opposite anal origin; pectoral fins broad and

triangular, their lengths from origin to free rear tip over 3/4 of pectoral anterior margins; pectoral origins varying from under fourth gill slit to under interspace between fourth and fifth gill slits; anal fin somewhat smaller than second dorsal, with preanal ridges very short or absent and a nearly straight to slightly concave posterior margin. Colour grey or brownish above, without a colour pattern. Moderate-sized sharks, adults probably not exceeding 2 m.

Remarks : This genus is usually synonymized with Carcharhinus but was revived for Carcharias (Prionodon) temmincki Müller & Henle, 1839 by Compagno (1970, 1979). See the latter account for the rationalle for recognizing this genus. Garrick (1982) has excluded temmincki from Carcharhinus in his revision of the genus, and Cadenat & Blache (1981) has recognized Lamiopsis also.

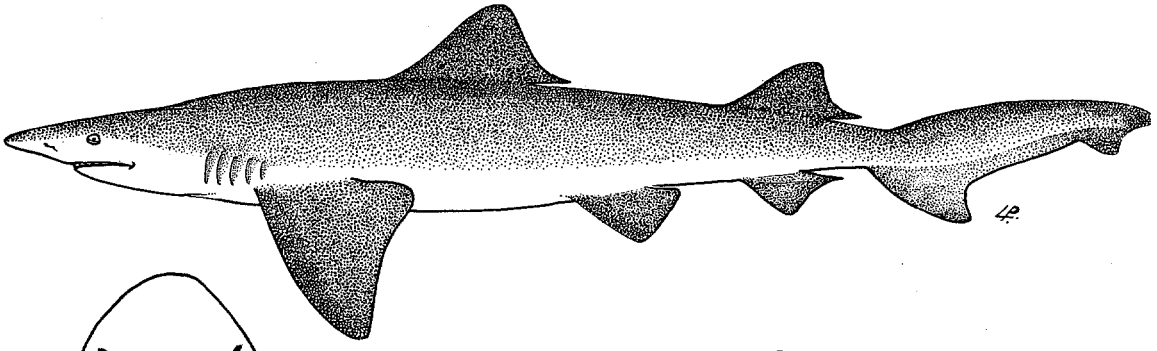
Lamiopsis temmincki (Müller & Henle, 1839) | CARCH Lamio 1

Carcharias (Prionodon) temmincki Müller & Henle, 1839, Syst.Beschr.Plagiost., (2):48, pl. 18. Syntypes: Berlin Zoological Museum, Zoological Society of London collection, Rijksmuseum van Natuurlijke Historie, Leiden and Museum National d'Histoire Naturelle, Paris. Type Locality: "Indien", Paris specimen from Pondicherry.

Synonymy : Carcharias tephrodes Fowler, 1905; Carcharhinus microphthalmus Chu, 1960.

Other Scientific Names Recently in Use : Carcharhinus temmincki (Müller & Henle, 1839); Eulamia temmincki (Müller & Henle, 1839).

FAO Names : En - Broadfin shark; Fr - Requin grandes ailes; Sp - Tiburón aletón.



underside of head

upper and lower teeth

Field Marks: A small, rather stocky requiem shark with a moderately long snout nearly equal to mouth width, a small round eye with a nictitating eyelid, second dorsal fin nearly as large as first, upper teeth serrated and with broad triangular cusps, lower teeth with smooth, hooked, narrow cusps, longitudinal upper precaudal pit, pectoral fins broad and triangular, anal fin with posterior margin nearly straight, and colour light grey or tan above, light below, with no prominent markings.

Diagnostic Features: See genus.

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