

= Zebra shark =

This species is sometimes called the leopard shark , a name otherwise used for *Triakis semifasciata* .

The zebra shark (*Stegostoma fasciatum*) is a species of carpet shark and the sole member of the family *Stegostomatidae* . It is found throughout the tropical Indo -@- Pacific , frequenting coral reefs and sandy flats to a depth of 62 m (203 ft) . Adult zebra sharks are distinctive in appearance , with five longitudinal ridges on a cylindrical body , a low caudal fin comprising nearly half the total length , and a pattern of dark spots on a pale background . Young zebra sharks under 50 ? 90 cm (20 ? 35 in) long have a completely different pattern , consisting of light vertical stripes on a brown background , and lack the ridges . This species attains a length of 2 @.@ 5 m (8 @.@ 2 ft) .

Zebra sharks are nocturnal and spend most of the day resting motionless on the sea floor . At night , they actively hunt for molluscs , crustaceans , small bony fishes , and possibly sea snakes inside holes and crevices in the reef . Though solitary for most of the year , they form large seasonal aggregations . The zebra shark is oviparous : females produce several dozen large egg capsules , which they anchor to underwater structures via adhesive tendrils . Innocuous to humans and hardy in captivity , zebra sharks are popular subjects of ecotourism dives and public aquaria . The World Conservation Union has assessed this species as Vulnerable worldwide , as it is taken by commercial fisheries across most of its range (except off Australia) for meat , fins , and liver oil . There is evidence that its numbers are dwindling .

= = Taxonomy = =

The zebra shark was first described as *Squalus varius* by Seba in 1758 . No type specimen was designated , though Seba included a comprehensive description in Latin and an accurate illustration of a juvenile . Müller and Henle placed this species in the genus *Stegostoma* in 1837 , using the specific epithet *fasciatus* (or the neuter form *fasciatum* , as *Stegostoma* is neuter while *Squalus* is masculine) from an 1801 work by Bloch and Schneider . In 1984 , Compagno rejected the name " *varius* / m " in favor of " *fasciatus* / m " for the zebra shark , because Seba did not consistently use binomial nomenclature in his species descriptions (though *Squalus varius* is one that can be construed as a binomial name) . In Compagno 's view , the first proper usage of " *varius* / m " was by Garman in 1913 , making it a junior synonym . Both *S. fasciatum* and *S. varium* are currently in wide usage for this species .

The genus name is derived from the Greek *stego* meaning " covered " , and *stoma* meaning " mouth " . The specific epithet *fasciatum* means " banded " , referring to the striped pattern of the juvenile . The juvenile coloration is also the origin of the common name " zebra shark " . The name " leopard shark " is sometimes applied to the spotted adult , but that name usually refers to the houndshark *Triakis semifasciata* , and is also sometimes used for the tiger shark (*Galeocerdo cuvier*) . Due to their different color patterns and body proportions , both juveniles and subadults have historically been described as separate species (*Squalus tigrinus* and *S. longicaudatus* respectively) .

= = Phylogeny = =

There is robust morphological support for the placement of the zebra shark , the whale shark (*Rhincodon typus*) , and the nurse sharks (*Ginglymostoma cirratum* , *Nebrius ferrugineus* , and *Pseudoginglymostoma brevicaudatum*) in a single clade . However , the interrelationships between these taxa are disputed by various authors . Dingerkus (1986) suggested that the whale shark is the closest relative of the zebra shark , and proposed a single family encompassing all five species in the clade . Compagno (1988) suggested affinity between this species and either *Pseudoginglymostoma* or a clade containing *Rhincodon* , *Ginglymostoma* , and *Nebrius* . Goto (2001) placed the zebra shark as the sister group to a clade containing *Rhincodon* and *Ginglymostoma* .

= = Description = =

The zebra shark has a cylindrical body with a large , slightly flattened head and a short , blunt snout . The eyes are small and placed on the sides of the head ; the spiracles are located behind them and are as large or larger . The last 3 of the 5 short gill slits are situated over the pectoral fin bases , and the fourth and fifth slits are much closer together than the others . Each nostril has a short barbel and a groove running from it to the mouth . The mouth is nearly straight , with three lobes on the lower lip and furrows at the corners . There are 28 ? 33 tooth rows in the upper jaw and 22 ? 32 tooth rows in the lower jaw ; each tooth has a large central cusp flanked by two smaller ones .

There are five distinctive ridges running along the body in adults , one along the dorsal midline and two on the sides . The dorsal midline ridge merges into the first dorsal fin , placed about halfway along the body and twice the size of the second dorsal fin . The pectoral fins are large and broad ; the pelvic and anal fins are much smaller but larger than the second dorsal fin . The caudal fin is almost as long as the rest of the body , with a barely developed lower lobe and a strong ventral notch near the tip of the upper lobe . The zebra shark attains a length of 2 @. @ 5 m (8 @. @ 2 ft) , with an unsubstantiated record of 3 @. @ 5 m (11 ft) . Males and females are not dimorphic in size .

The color pattern in young sharks is dark brown above and light yellow below , with vertical yellow stripes and spots . As the shark grows to 50 ? 90 cm (20 ? 35 in) long , the dark areas begin to break up , changing the general pattern from light @-@ on @-@ dark stripes to dark @-@ on @-@ light spots . There is substantial variation in pattern amongst adults , which can be used to identify particular individuals . In 1964 , a partially albino zebra shark completely lacking spots was discovered in the Indian Ocean . The shark , a 1 @. @ 9 m (6 @. @ 2 ft) long mature female , was unusual in that albino animals rarely survive long in the wild due to their lack of crypsis .

= = Distribution and habitat = =

The zebra shark occurs in the tropical waters of the Indo @-@ Pacific region , from South Africa to the Red Sea and the Persian Gulf (including Madagascar and the Maldives) , to India and Southeast Asia (including Indonesia , the Philippines , and Palau) , northward to Taiwan and Japan , eastward to New Caledonia and Tonga , and southward to northern Australia .

Bottom @-@ dwelling in nature , the zebra shark is found from the intertidal zone to a depth of 62 m (203 ft) over the continental and insular shelves . Adults and large juveniles frequent coral reefs , rubble , and sandy areas . There are unsubstantiated reports of this species from fresh water in the Philippines . Zebra sharks sometimes cross oceanic waters to reach isolated seamounts . Movements of up to 140 km (87 mi) have been recorded for individual sharks . However , genetic data indicates that there is little exchange between populations of zebra sharks , even if their ranges are contiguous .

= = Biology and ecology = =

During the day , zebra sharks are sluggish and usually found resting on the sea bottom , sometimes using their pectoral fins to prop up the front part of their bodies and facing into the current with their mouths open to facilitate respiration . Reef channels are favored resting spots , since the tightened space yields faster , more oxygenated water . They become more active at night or when food becomes available . Zebra sharks are strong and agile swimmers , propelling themselves with pronounced anguilliform (eel @-@ like) undulations of the body and tail . In a steady current , they have been seen hovering in place with sinuous waves of their tails .

The zebra shark feeds primarily on shelled molluscs , though it also takes crustaceans , small bony fishes , and possibly sea snakes . The slender , flexible body of this shark allows it to wriggle into narrow holes and crevices in search of food , while its small mouth and thickly muscled buccal cavity allow it to create a powerful suction force with which to extract prey . This species may be preyed

upon by larger fishes and marine mammals . Known parasites of the zebra shark include four species of tapeworms in the genus *Pedibothrium* .

== Sociality ==

Zebra sharks are usually solitary , though aggregations of 20 ? 50 individuals have been recorded . Off southeast Queensland , aggregations of several hundred zebra sharks form every summer in shallow water . These aggregations consist entirely of large adults , with females outnumbering males by almost three to one . The purpose of these aggregations is yet unclear ; no definite mating behavior has been observed between the sharks . There is an observation of an adult male zebra shark biting the pectoral fin of another adult male and pushing him against the sea floor ; the second male was turned on his back , and remained motionless for several minutes . This behavior resembles pre @-@ copulatory behaviors between male and female sharks , and in both cases the biting and holding of the pectoral fin has been speculated to relate to one shark asserting dominance over the other .

== Life history ==

The courtship behavior of the zebra shark consists of the male following the female and biting vigorously at her pectoral fins and tail , with periods in which he holds onto her pectoral fin and both sharks lie still on the bottom . On occasion this leads to mating , in which the male curls his body around the female and inserts one of his claspers into her cloaca . Copulation lasts for two to five minutes . The zebra shark is oviparous , with females laying large egg capsules measuring 17 cm (6 @.@ 7 in) long , 8 cm (3 @.@ 1 in) wide , and 5 cm (2 @.@ 0 in) thick . The egg case is dark brown to purple in color , and has hair @-@ like fibers along the sides that secure it to the substrate . The adhesive fibers emerge first from the female 's vent ; the female circles vertical structures such as reef outcroppings to entangle the fibers , so as to anchor the eggs . Females have been documented laying up to 46 eggs over a 112 @-@ day period . Eggs are deposited in batches of around four . Reproductive seasonality in the wild is unknown .

In captivity , the eggs hatch after four to six months , depending on temperature . The hatchlings measure 20 ? 36 cm (7 @.@ 9 ? 14 @.@ 2 in) long and have proportionately longer tails than adults . The habitat preferences of juveniles are unclear ; one report places them at depths greater than 50 m (160 ft) , while another report from India suggests they inhabit shallower water than adults . The stripes of the juveniles may have an anti @-@ predator function , making each individual in a group harder to target . Males attain sexual maturity at 1 @.@ 5 ? 1 @.@ 8 m (4 @.@ 9 ? 5 @.@ 9 ft) long , and females at 1 @.@ 7 m (5 @.@ 6 ft) long . The lifespan has been estimated to be 25 ? 30 years in the wild . There is a single report of a female producing young asexually .

== Human interactions ==

Docile and slow @-@ moving , zebra sharks are not dangerous to humans and can be easily approached underwater . However , they have bitten divers who pull on their tails or attempt to ride them . As of 2008 there is one record of an unprovoked attack in the International Shark Attack File , though no injuries resulted . They are popular attractions for ecotourist divers in the Red Sea , off the Maldives , off Thailand 's Phuket and Phi Phi islands , on the Great Barrier Reef , and elsewhere . Many zebra sharks at diving sites have become accustomed to the presence of humans , taking food from divers ' hands and allowing themselves to be touched . The zebra shark adapts well to captivity and is displayed by a number of public aquaria around the world . The small , attractively colored young also find their way into the hands of private hobbyists , though this species grows far too large for the home aquarium .

The zebra shark is taken by commercial fisheries across most of its range , using bottom trawls , gillnets , and longlines . The meat is sold fresh or dried and salted for human consumption .

Furthermore , the liver oil is used for vitamins , the fins for shark fin soup , and the offal for fishmeal . Zebra sharks are highly susceptible to localized depletion due to their shallow habitat and low levels of dispersal between populations , and market surveys suggest that they are much less common now than in the past . They are also threatened by the degradation of their coral reef habitat by human development , and by destructive fishing practices such as dynamiting or poisoning . As a result , the World Conservation Union has assessed this species as Vulnerable . Off Australia , the only threat to this species is a very low level of bycatch in prawn trawls , and there it has been assessed as of Least Concern .