

## *Carcharhinus limbatus* (Blacktip Shark)

Family: Carcharhinidae (Requiem Sharks)

Order: Carcharhiniformes (Ground Sharks)

Class: Chondrichthyes (Cartilaginous Fish)



**Fig. 1.** Blacktip shark, *Carcharhinus limbatus*.

[<http://www.gofishingbg.com/t5708-topic>, downloaded 2 April 2015]

**TRAITS.** Fast moving shark with black-tipped fins (Fig. 1), although adults may not have markings on fins (Compagno et al., 1989). Scales are rooted in stratum laxum of the dermis by mostly collagen fibres (some elastin) and have 5-7 longitudinal riblets (Motta et al., 2012). Stout bodied, average length of 2.6m total length (TL). Pointed, narrow, long snout (Fig. 3). Gill slits are long and erect. Upper teeth are narrow-cusped (Fig. 4). Primary dorsal fin is high but does not have an interdorsal ridge (Compagno et al., 1989). Sexually dimorphic: females have ovaries and uteri; males have claspers – a pair of tube-like copulatory organs that transmit sperm from male to female. Rare hermaphroditism is known to occur in sharks possessing ovaries, uteri and claspers (Castro, 1996).

**DISTRIBUTION.** Distributed throughout the globe in tropical as well as subtropical continental waters (Owens, 2008) (Fig. 2). Found in Mediterranean but not the Black Sea or the Adriatic Sea. Also found in temperate waters (Serena, 2005). Found near Massachusetts, USA in Western

Atlantic all the way to the south coast of Brazil. Observed in the Eastern Atlantic from the Mediterranean Sea and onwards south to central Africa (Garrick, 1982). Distributed across Indian Ocean near South Africa and onwards to the western part of the continent of Australia. Also known to inhabit the Red Sea, Persian Gulf, Pacific Ocean (along Indo-Australian archipelago near Tahiti, the Marquesas and Hawaii). Seen in the eastern Pacific from Peru to California in North America (Last and Stevens, 1994).

**HABITAT AND ACTIVITY.** Species cannot be accurately described as truly oceanic. Lives in pelagic zones, coasts at depths varying from the surface to 100m deep (Serena, 2005). Can live 30m deep in estuaries and shallow bays, close in-shore (Compagno et al., 1989). Nurseries usually in coastal lagoons (Serena, 2005). Sharks return to the same summer habitats in subsequent summers that they do not inhabit during winters (Camhi et al., 2009). Found near some oceanic islands, but primarily a continental species. These sharks show temporal periodicity patterns as they aggregate during daytime hours but disperse at night, usually to avoid predation and improve feeding efficacy. However deviation from this has been observed as aggregations persist at night during the month of June. Sharks aggregate in the early and late summer months but there is a decline in aggregation through the months of July to September (Heupel and Simpfendorfer, 2005). Males and females aggregate in schools segregated by sex in periods not in the mating season (Dudley and Cliff, 1993).

**FOOD AND FEEDING.** Feeds primarily on schooling fishes; also feeds on crustaceans and cephalopods (Bonfil and Abdallah, 2004). Also feed on small bony fish, shrimp, Spanish mackerel, gafftopsail catfish, Atlantic sharpnose shark, oyster toadfish, bonnethead (*Sphyrna tiburo*), ray (*Rhinoptera bonasus*), menhaden (*Brevoortia tyrannus*), spot (*Leiostomus xanthurus*) and flounders.

**POPULATION ECOLOGY.** Most abundant species of all of the large coast species found in the north-west Gulf of Mexico (Branstetter, 1981). Intrinsic rate of increase is approximately 0.1 (Camhi et al., 2009). Commonly occurs in loose aggregations (Castro, 1996). Life span is 10-18 years. Males mature at 4-5 years and females mature at 6-8 years. At birth they are 53-65 cm TL; at maturity males are 130 cm TL, females are >155cm TL (Camhi, 1998).

**REPRODUCTION.** Viviparous (live bearing), with a yolk sac placenta. They exhibit mating behaviours in which male bites female to position her during copulation and in this way he holds on to part of the flank as well as the latter part of the pectoral fin. Typical bites found on wild females were 80-150 mm long and reached depths of 15-20 mm and penetrated the greater portion of the body wall. These bites do not puncture the peritoneum (Rocha et al., 2008). Ovulation usually occurs in May (Castro, 1996). Gestation period is approximately 10-12 months (Serena, 2005). Minimum-maximum brood size is 3-9 embryos although typically broods are 4-6 embryos (Bigelow and Schroeder, 1948). More specifically, average brood size of females smaller than 173cm TL is 4.9 young whereas females larger than 173 cm TL have an average brood size of 6.1 young. Reproductive periodicity is 2 years (Camhi, 1998). Fecundity increases proportionally with size and age of maternal parents (Baremore and Passerotti, 2013). The blacktip shark has been genetically proven to exhibit parthenogenesis as a mode of reproduction. It utilizes asexual reproduction and its parthenogenetic embryo shows that the level of

homozygosity relative to the mother is very high in this species, which is explained by the mechanism of automictic parthenogenesis (Chapman et al., 2008).

**BEHAVIOUR.** Response to sharksuckers: sharks rotate along longitudinal axis (roll), rotate along vertical axis (yaw), rotate along lateral axis (pitch). Also perform complex rotational patterns known as wiggle, shake and wind - which is an intense three dimensional response that can actually dislocate a sharksucker. They also freeze, yawn and flicker in response to sharksuckers (Ritter and Brunnschweiler, 2003). Blacktips jump out of water and spin mid-air over its own horizontal axis numerous times before falling back into the water when feeding. Also leap vertically out of water up to 2m high simultaneously rapidly spinning before suddenly curling its body and falling back into the sea (Castro, 1996).

Juvenile behaviour: Juveniles are known as pups and inhabit distinct nursery areas in shallow coastal waters that are separated from the adult population during a month-long neonate stage. They increase in size by 0.25-0.3 m during the first 6 months of growth after which they increase in size by 0.2m over the 2<sup>nd</sup> year of living. As the species nears adult hood, growth rate progressively decreases (Branstetter, 1987).

Antipredator behaviour: Performs leaping behaviours as previously described as a means of avoiding human predation. It has been known to perform these out-of-water leaping motions when hooked on fishing line to free itself or break the line (Castro, 1996).

**APPLIED ECOLOGY.** Conservation status on the IUCN red-list is Near Threatened. Proximity to shores makes it highly vulnerable to alterations made to the habitat by humans as well as fishing pressure (Serena, 2005). Longlines and gillnets are used to catch *C. limbatus* commercially but they are also caught in trawlnets. Sport fishermen consider the species essential. Sometimes caught by tuna fisheries. Meat consumed by humans while the liver, hides and fins are harvested for other uses such as shark-oil, shark-fin soup and leather, respectively (Bonfil and Abdallah, 2004). Second only to the sandbar shark as the most vital commercial and recreational shark species off southeastern coast of North America. Considered the finest shark species for consumption, partly due to pinkish-coloured flesh. Abundance near shore and the challenge it poses in capture makes it a desired catch for sportfishers (Castro, 1996). It is the most abundant species being caught in the Indian fishing industry (Hanfee, 1996).

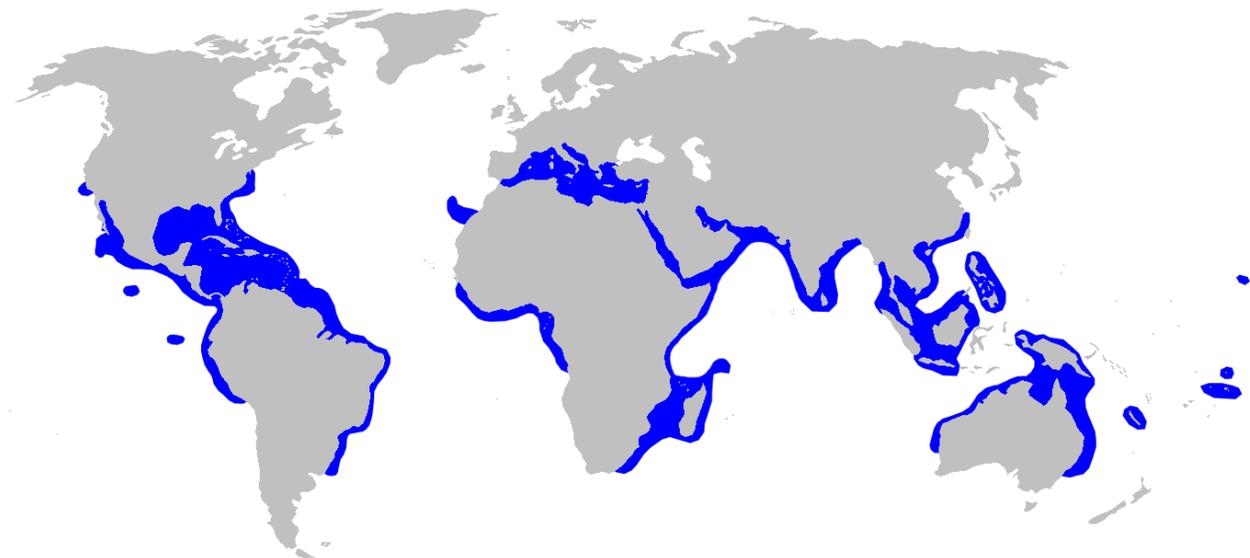
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**Fig. 2.** Geographic distribution of *C. limbatus*.

[<http://en.academic.ru/dic.nsf/enwiki/2872980>, downloaded 2 April 2015]



**Fig. 3.** Underneath of snout of *C. limbatus*.

[<https://www.daff.qld.gov.au/fisheries/species-identification/shark-identification-guide/photo-guide-to-sharks/sharks,-part-1/blacktip-shark-complex-common-and-Australian>, downloaded 2 April 2015]



**Fig. 4.** Upper tooth of *C. limbatus*.

[<https://www.daff.qld.gov.au/fisheries/species-identification/shark-identification-guide/photo-guide-to-sharks/sharks,-part-1/blacktip-shark-complex-common-and-Australian>, downloaded 2 April 2015]