Indian Journal of Geo Marine Sciences
Vol. 49 (07), July 2020, pp. 1298-1301

Short Communication

Occurrence of the near threatened Tiger shark, *Galeocerdo cuvier* Peron and Lesueur, 1822 from Cuddalore coastal waters, Tamil Nadu, southeast coast of India

B Sureandiran[a], M P Arulmoorthy*[,a], G Anbarasi[b] & M Srinivasan[a]

[a]CAS in Marine Biology, Faculty of Marine Sciences, Annamalai University, Parangipettai, Tamil Nadu – 608 502, India

[b]PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Affiliated to Bharathiyar University, Coimbatore, Tamil Nadu – 641 029, India

*[E-mail: mparulguru@gmail.com]

Received 19 June 2019; revised 24 July 2019

Galeocerdo cuvier Peron and Lesueur, 1822 is a tiger shark, a common predatory shark distributed in temperate and tropical countries globally. *G. cuvier* is also synonymised as *G. arcticus* (Faber, 1829) and *G. rayneri* (Mc Donald & Barron, 1868). We report the first observation of one male and one female tiger shark captured by otter trawler at Mudasalodai landing centre, Cuddalore coastal waters, southeast coast of India. Sex was identified by the presence of pair of claspers observed in the ventral side. Male specimen weighed about 1.9 kg and female weighed about 1.65 kg. The morphometric characters of the shark were measured and tabulated. The present study confirmed the occurrence of *G. cuvier* along the southeast coast of India particularly in the Tamil Nadu coastal waters.

[**Keywords**: Claspers, *Galeocerdo cuvier*, Mudasalodai, Tamil Nadu, Tiger shark]

Introduction

Tiger shark *Galeocerdo cuvier* Peron and Lesueur, 1822 is a predatory shark species distributed in tropical and temperate coastal waters across the world oceans. This is the largest shark in the family Carcharhinidae, which represents twelve genera and 54 valid species of sharks. *G. cuvier* is the only species which represent the genus *Galeocerdo*[1]. The maximum size of the species (740 cm) was reported by Raje & Joshi[2] in Mumbai coasts. Generally, the common size of *G. cuvier* is approximately 250 cm which was reported throughout the coastal waters of the world. The species shows ubiquitous distribution in temperate and tropical countries and was widely reported from USA, Mexico, Massachusetts, Caribbean Islands in Western Atlantic; Morocco, Canary Island, Gambia, Angola, UK, Morocco, Senegal, Guinea and Angola in Eastern North Atlantic; and from Thailand, South Africa, India, Red Sea, Pakistan, Sri Lanka, Vietnam, Australia, Japan, Indonesia, Philippines, Southern China, etc.[3]. It generally thrives in the surface and intertidal watersup to 140 m depth[3]. *G. cuvier* commonly feeds on flying fishes, flatfishes, parrot fishes, eels, cat fishes, puffers, porcupine fishes, skates, sea birds, turtles, marine reptiles, dolphins, sea lion, seals and mammals[4]. It exhibit ovoviviparous type of breeding. Both male and female shark attain the sexual maturity at the size of 290 cm. It is recorded as nearly threatened species in the IUCN red list. The shark is generally caught for its medicinal values (leather and cartilage), ornaments from the teeth, soup from the fin, and for vitamin from the liver oil. The liver of *G. cuvier* contains high level of vitamin 'A'. These sharks are caught throughout in the western coast of India, but unexpectedly there are no scientific records to assess the impact on its fishery and reproductive biology. The present study gives the information about the occurrence of the near threatened tiger shark, *G. cuvier* from Cuddalore coastal waters, Tamil Nadu, southeast coast of India.

Materials and Methods

The shark specimens were collected on 4th April, 2019 from Mudasalodai landing centre (11^{o}29' N; 79^{o}46' E), Cuddalore coastal waters, Tamil Nadu, Southeast coast of India. The sharks were caught by otter board trawlers operated for pelagic and deep sea fishing. The species was identified with the help of FAO species identification guide and by Central Marine Fisheries Resources of India (CMFRI) Atlas on the elasmobranch fishery resources of India. The morphometric measurements and other morphological characters were measured and recorded[5]. After the examination, the animal was preserved in 10 % formalin and is kept in the Museum of CAS in Marine Biology, Annamalai University, Parangipettai, Tamil Nadu, India.

Results and Discussion

On 4th April, 2019 a pair of juvenile species of *G. cuvier*, one male tiger shark measuring a total length of 89.2 cm with a weight of 1900 g and one

female tiger shark measuring a total length of 81 cm with a weight of 1650 g were landed at Mudasalodai landing centre (11°29' N; 79°46' E), Tamil Nadu, southeast coast of India (Figs. 1 & 2).

Materials examined

Description

Both the male and female tiger sharks had a larger head with very small and bluntly rounded snouts, large mouth, small nostrils and large spiracles. Upper labial furrows passes behind the eye lines. The posterior notches were absent in larger eyes. The first dorsal fin is much larger than the second dorsal fin with the presence of interdorsal ridge. Caudal peduncle is relatively narrow and small keels were presents on each side of peduncle. The length of the upper caudal fin is much higher than the lower caudal fin. The caudal fins with long tapering tip. The arrangement of teeth was similar in upper and lower jaws with heavy serrations. Both male and female bear equal number of teeth, 21 on the lower jaw and 24 on the upper jaw. Other morphometric characters are represented in the Table 1. The body/trunk, fins and sides of the body, with characteristic grey colour and long vertical tiger stripe markings were present on the dorsal side of the body. The head and pectoral fins appeared uniformly dark.

India has the longest coastline measuring to 7516.6 km, covering 13 states and union territories[6] and exhibit diverse fishery resources. The average contribution from west coast is 67 % and from east coast is 33 %, which includes pelagic fin fishes 55 %, demersal 26 %, crustaceans 15 % and molluscus 4 %[7] to the total marine fishery resources of India. In the last decade, due to the increase in temperature (global warming) and formation of tropical cyclones considerably affected the diversity of fishery resources along Indian coastal areas and resulting in the immigration of new faunal species from other coastal regions.

Tiger sharks from Hawaiian coastlines were well documented and most of the shark attacks at Hawaii

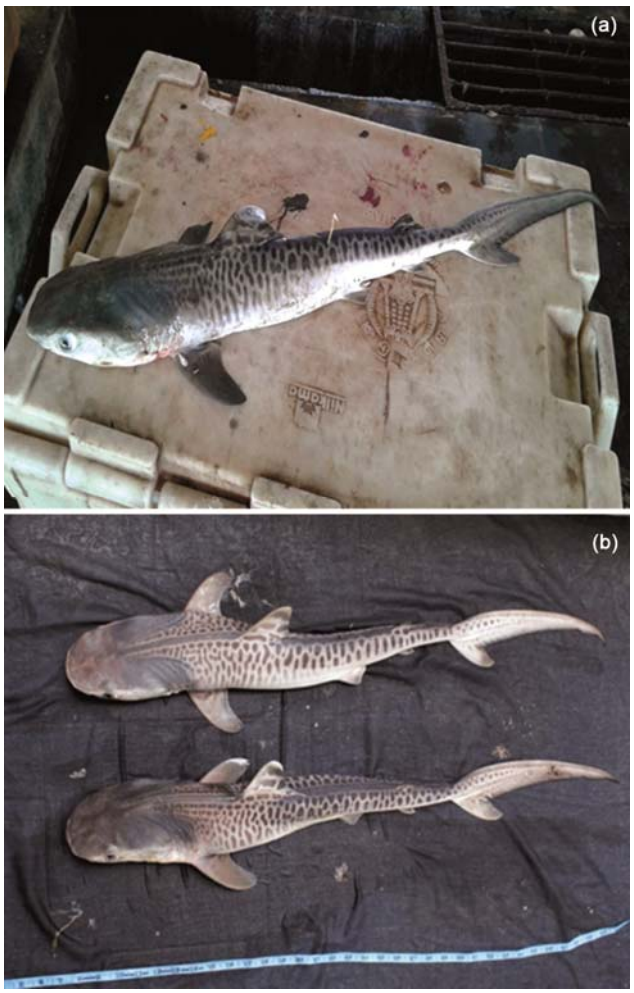

Fig. 1 — Specimens of *Galeocerdo cuvier* caught in the Cuddalore coastal waters, Tamil Nadu, Southeast Coast of India

Fig. 2 — (A) Male tiger shark with claspers, and (B) Female tiger shark without claspers

Table 1 — Morphometric measurements for tiger Shark *Galeocerdo cuvier* caught in the Cuddalore coastal waters, Tamil Nadu, Southeast Coast of India

Measurements	Female	Male
Total length (cm)	81	89.2
Head length (cm)	15.3	17.5
Trunk length (cm)	24.5	25.7
Tail Length (cm)	41.2	46
Head width (cm)	11.4	12.5
Trunk width (cm)	20.6	16
Snout to orbit (cm)	3.8	3.7
Snout to nostril (cm)	2.6	2.7
Inter orbital distance (cm)	1.7	1.7
Between Nostrils (cm)	3.8	4.1
Eye diameter (cm)	2.1	1.9
Snout to 1st gill (cm)	12.1	13.4
Snout to pelvic origin (cm)	35.8	36.2
1st dorsal base (cm)	5.8	5.9
1st dorsal height (cm)	5.3	5.8
Between dorsal bases (cm)	17.8	17.8
2nd dorsal base (cm)	2.8	2.9
2nd dorsal height (cm)	2.7	3.6
Upper caudal fin length (cm)	28.1	29.9
Lower caudal fin length (cm)	8.3	9.3
Anal height (cm)	2.1	2.1
Anal base (cm)	2.2	2.6
Pre-oral length (cm)	4.1	4.2
Mouth width (cm)	9.3	9.5
Pectoral fin length (cm)	10.1	10.1
Pectoral fin base (cm)	3.8	3.8
Claspers length (cm)	-	2.2
Weight (g)	1650	1900

are attributed to tiger sharks[8]. Tiger sharks are circumglobal in distribution and considered as one of the most dangerous species across the world[9]. Although tiger shark was not fished commercially for food; they are listed in the "near threatened" category in the IUCN red list as it was captured previously for the liver, fins, and jaws for their medicinal properties[10]. The biggest tiger shark weighing 569 kg was caught in Queensland in 1953(ref. 11). The tiger shark *G. cuvier* is regarded as the most dangerous shark next to the white shark, *Carcharodon carcharias*, in terms of its attack frequency to human beings in the oceans[9].

The tiger sharks are caught and widely reported throughout the west coast of India but hardly any reporting are there from the east coast of India[12]. In 2013, the first occurrence of tiger shark was reported in Tuticorin coast, Tamil Nadu, southeast coast of India[12]. After that the current report confirms the presence of tiger shark in southeast coast of India.

Generally, the recruitment of tiger sharks occurs along the coastal areas at a depth of 100 m or below. Within a year time, the juveniles grow to double of their size with rapid growth rate. Hence, the specimens described in the present study (male 89.2 cm and female 81 cm) are probably born recently, probably in the later part of 2018 and assumed to be only few months old. Juvenile tiger sharks are characterized by very slender and soft flexible bodies, with an inefficient motion of swimming and thereby are vulnerable to predators[13]. That's why mostly juvenile tiger sharks are captured as fishery by-catch in many fishing countries around the world, including targeted longline fishing for swordfish and tuna, and predominantly in the trawlers operating closer to the continental shelves[14,15].

Conclusion

The present investigation confirms the occurrence of tiger shark *Galeocerdo cuvier* in the Bay of Bengal sea, southeast coasts of India. Nevertheless, this observation should not be considered as evidence of the solid occurrence of the particular species in the region as there are not many reporting of the species from the region.

Acknowledgements

The authors are thankful to the authorities of Annamalai University for their support and encouragement.

Conflict of Interest

The authors declare that they have no conflict of interest.

Author Contributions

BS: Field survey; AM: Study conception, design and acquisition of data; AM & GA: Drafting of manuscript, and MS: Critical revision.

References

1 Compagno L J V, Dando M & Fowler S, *Sharks of the World*, (Princeton, New Jersey, Princeton University Press) 2005, pp. 368.

2 Raje S G & Joshi K K, Elasmobranchs, In: *Status of Exploited marine fishery Resources of India*, (CMFRI) 2003, pp. 92-101. ISBN 81-901219-3-6

3 Compagno L J V, Sharks of the world. An annotated and illustrated catalogue of shark species to date. Part II (Carcharhiniformes), *FAO Fisheries Synopsis*, 125 (4) (1984) 251-655.

4 Devadoss P, Observations on the length-weight relationship and food and feeding habits of spade nose shark, *Scoliodon*

laticaudus Muller and Henle, *Indian J Fish*, 36 (2) (1989) 169–174.

5 Serena F, Barone M, Mancusi C, Magnelli G & Vacchi M, The MEDLEM database application: a tool for storing and sarin the large sharks data collected in the Mediterranean countries, In: *The Proceedings of the Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean*, 23rd edn, edited by N Basusta, C Keskin, F Serena & B Seret, (Istanbul-Turkey: Turkish Marine Research Foundation) 2006, pp. 118–27.

6 Venkatraman K & Wafar M, Coastal and Marine Biodiversity of India, *Indian J Geo-Mar Sci*, 34 (1) (2005) 57-75.

7 CMFRI, *Annual Report 2011-12*, (Central Marine Fisheries Research Institute, Cochin) 2012, pp. 186.

8 Wetherbee B M, Lowe C G & Crow G L, A review of shark control in Hawaii with recommendations for future research, *Pac Sci*, 48 (2) (1994) 95-115.

9 Randall J E, Review of the biology of the tiger shark (*Galeocerdo cuvier*), *Australian J Mar Freshwater Res*, 43 (1) (1992) 21-31.

10 Simpfendorfer C A, Goodreid A B & McAuley R B, Size, Sex and geographic variation in the diet of the tiger shark, *Galeocerdo cuvier*, from Western Australian waters, *Environ Biol Fishes*, 61 (1) (2001) 37-46. https://doi.org/10.1023/A:1011021710183

11 Raje S G, Sivakami S, Mohanraj G, Manojkumar P P, Raju A, *et al.*, An Atlas on the Elasmobranch Fishery Resources of India, (CMFRI, P.B.No.1603) 2007.

12 Kannan K, Ranjith L, Sureshkumar K, John J K, Mohamed S S, *et al.*, Occurrence of near threatened tiger shark, *Galeocerdo cuvier* (Peron and Lesueur, 1822) from Tutcorin Coast, Tamil Nadu, *Mar Fish Infor Sew T & E Ser*, No 216 (2013), pp. 13-14. http://eprints.cmfri.org.in/id/eprint/9458.

13 Branstetter S, Musick J A & Colvocoresses J A, A comparison of the age and growth of the tiger shark, *Galeocerdo cuvieri*, from off Virginia and from the northwestern Gulf of Mexico, *Fish Bull*, 85 (2) (1987) 269–279.

14 Anderson E D, Analysis of various sources of pelagic shark catches in the northwest and western central Atlantic Ocean and Gulf of Mexico with comments on catches of other large pelagic, In: *Shark catches from selected fisheries off the US East Coast*, (Report No. 31) (US East Coast: NOAA Technical Report, NMFS Press) 1985, pp. 14.

15 Berkeley S A & Campos W L, Relative abundance and fishery potential of pelagic sharks along Florida's east coast, *Mar Fish Rev*, 50 (1) (1988) 9–16.