

Diversity of Ray fishes (Batoidea) in Parangipettai, southeast coast of India

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Abstract

The sustainability of marine ecosystems depends on the ancient and varied class of animals known as chondrichthyes. An increase in fishing pressure brought on by an excessive demand for chondrichthyes has threatened the extinction of around 30% of species in recent years. India, which is India's major contributor to its exports of sharks, is the second-largest shark landing country in the world. The present study was carried out for period of six months from October 2021- September 2022 in Mudasalodai landing centre of East coast region. Totally 13 rays were recorded, belongs to six families. Due lack of data on diversity of rays and taxonomical identification carried out in this research.

Keywords: Ray fish, diversity, mudasalodai, taxonomical identification

Introduction

Rays, Sawfishes, sharks, and skates come under Elasmobranchs; some are endangered marine species worldwide (Bonifil R (2002). Stingrays (Chondrichthyes: Rajiformes) are distributed in the Atlantic, Indian, and Pacific Oceans. Stingrays usually live in shallow inshore waters with sandy or silty bottoms. They feed on teleost fish, crustaceans, mollusks, digested food, and mud (Raje SG, 2003) [7]. Stingrays are important as food items, medicinal items, leather products, and aquarium fish (Padmavathi & Babu, 2007). Stingrays have characteristically one or more venomous spines in their tails, which can stab unwary swimmers who happen to tread on or unduly disturb them. The spine at the base of their tail is covered by an epithelium having great quantities of glandular cells producing venom (Halstead, 1970). When injected into the victim, naturally, there would be nausea, vomiting, headache, dizziness, and respiratory embarrassment if untreated (Mullarney, 1970). Torpedo rays (Narcine and Torpedo), which are bottom-dwellers in all shallow temperate and warm seas, are the most potent marine electric fishes, in contrast to stingrays. The electric potential of electric rays varies widely, with some of them producing an electric field as strong as 220 volts. These specialised organs are used by fish for navigation and defence by the fish to find and shock prey. A human receives an electric shock when they make direct contact with an animal's skin surface. They are vulnerable to human activities such as fishing, rays, and shark caught by a fishing vessel. India is one of the top countries in elasmobranch fishing, which contributes to the economy of the country and the food security of the people in the country. Dulvy NK *et al.* (2004) say that the elasmobranch populations are in danger because catches have decreased over the past few decades. Raje SG *et al.* (2002) [2] said that the elasmobranch fishery made up 4% of India's catches and 3% of Tamil Nādu. Among the total catches, 1.6% from Tamilnadu was highly dominated by sting rays caught by trawl net, whereas carcharhinid sharks were dominant in the catch by mechanized gillnet (Moharraj G *et al.* 2009) [19].

Materials and methods

The samples were taken from the Mudasalodai landing centre, which is close to the Parangipettai biological station (11°29'N; Long. 79°46' E). This area lies between the mouth of the Vellar estuary and the Killai backwaters. Two hundred mechanized boats have been engaged in fishing activities. Fish landing centre will be very active soon after fish are landed fresh in the morning. The species were identified with the help of FAO identification sheets and the CMFRI Atlas on the elasmobranch fishery resources of India. The animals were preserved in 10% formalin after the examination and kept in the laboratory at CAS in Marine Biology, Annamalai University, Parangipettai, and Tamil Nadu, India.

Result

A total of four families, including 15 species, were recorded in the Mudasalodai fish landing center. The Dasyatidae family include 3 genus and 5 species; the Narcinidae family includes 1 genus and 3 species; the Mylobatidae family includes 2 genus and 2 species; the Gymnuridae family includes 1 genus and 1 species; the family Torpedinidae includes 1 genus and 1 species; the Mobulidae family which included 1 genus and 1 species were found along the Mudasalodai fish landing centre in this study. The dominant species recorded are from the Dasyatidae family, Narcinidae family, Mylobatidae family, Gymnuridae family, Torpedinidae family, and Mobulidae family, respectively.

Taxonomical key identification characters

1. *Narcine timlei*

Phylum: Chordata, Class: Chondrichthys, Order: Torpediniforms, Family: Narcinidae, Genus: *Narcine*, Species: *N. timlei*
Subtrapezoidal disc, a uniform purplish-brown, brown, or tan dorsal coloration (devoid of any other markings), and wide, broadly rounded tooth bands

2. *Narcine brunnea*

Phylum: Chordata, Class: Chondrichthys, Order: Torpediniforms, Family: Narcinidae, Genus: *Narcine*, Species: *N. brunnea*

A rounded pectoral fin disc and two dorsal fins, the first usually smaller than the second and placed behind the pelvic fin bases. The tail is longer than the disc and has a lateral fold.

3. *Narcine prodorsalis*

Phylum: Chordata, Class: Chondrichthys, Order: Torpediniformes, Family: Narcinidae,

Genus: *Narcine*, Species: *N. prodorsalis*

Maximum total about 40 cm. An inshore and offshore num fish of continental tropical waters, from depths of 50 m. Biology little known.

4. *Himantura imbricata*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Dasyatidae, Genus: *Himantura*, Species: *H. imbricata*

The disc is as wide as it is long, with a somewhat developed snout and significantly larger spiracles than eyes. The floor of the mouth has two buccal processes. tail that is shorter than the disc with two spines. Row of conical spines along the shoulder and back; interspace between spiracles and centre of back with rough tubercles; continuing backward to caudal spine. brownish on top and pale on bottom.

5. *Himantura uarnak*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Dasyatidae, Genus: *Himantura*, Species: *H. uarnak*

disc with a sharp end, a rhomboidal shape, and a broader width than length. long, undulating mouth with four fleshy papillae on the floor of the mouth, the outer two of which are smaller than the inner ones. The tail is cylindrical and whip-like, much longer than the disc, and has one active stinger. The tail has no cutaneous folds. Adult discs have a brown to black dorsal surface with a leopard, reticulated, or honeycomb pattern. Brown, black, and white or yellow tail stripes.

6. *Himantura jenkinsii*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Dasyatidae, Genus: *Himantura*, Species: *H. jenkinsii* longer than it is wide, with a sharply pointed nose. 5.8 times the diameter of the disc Spherical objects nearby, eye 2.4 times in interplanetary space. four buccal processes in the mouth. tail with one or two serrated spines, a whip-like shape, and 1.9 to 2.4 times the length of the disc. rough skin Color: creamy white below, uniformly light brown above. Light and black bands alternate on the tail in juveniles and embryos.

7. *Dasyatis zugei*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Dasyatidae, Genus: *Dasyatis*, Species: *D. zugei*

Mouth undulated, interorbital space concave; disc sub quadrangular, as long as broad; spiracles considerably bigger than eyes; snout extremely pointed and produced. Several tubercles in the median line of the back; a tubercle-roughened tail that resembles a whip; upper and lower cutaneous folds; and one serrated spine Color: Pale on the disc edges and ranging from yellow to reddish brown.

8. *Pastinachus sephen*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Dasyatidae, Genus: *Pastinachus*, Species: *P. sephen*. Disc that resembles a quadrangle. The diameter of the disc ranges from 1.3 to 1.5. The upper jaw's dental surface is

angular. Three flattened central tubercles in the centre of the back are granular. The tail is almost twice as long as the disc and is pretty thick. Serrated caudal spine inserted above the second quarter of the tail; large cutaneous fold ventrally commencing before a level from insertion of caudal spine and finishing below posterior third of tail. Leaden grey on the back; white on the ventral area.

9. *Gymnura poecilura*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Gymnuridae, Genus: *Gymnura*, Species: *G. poecilura*.

lozenge-shaped disc that is twice as wide as it is long. The snout's pointy tip protrudes only a little bit. With a short, weakly serrated spine at the proximal end, the tail is nearly as long as the disc. The tail has a little midline ridge on both sides. Skin is soft. Color: On the dorsal side, it may vary, but is often a variety of grey colours with a little greenish yellow reflection. There are many round, creamy-yellow spots all over the dorsal surface. white or yellowish on the ventral surface. white tail with thick, blackish stripes that are substantially broader than the lighter interspaces.

10. *Aetobatus narinari*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Mylobatidae, Genus: *Aetobatus*, Species: *A. narinari*

Disc rhomboid, much broader than long; snout projecting as a single lobe, snout elongated, narrow with a narrow ridge under eye to disc. One raw of tooth plates in each jaw. Outer corners of pectoral fins pointed. Caudal spine present. Long whip like tail with a long spine near the base. Colour: Dorsal surface blue or black with solid white spots.

11. *Mobula diabol*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Mobulidae, Genus: *Mobula*, Species: *M. diabol*

The disc is broader than it is long, and the pectoral points are rounded. The snout projects forward into two fleshy "horns" on the cephalic region. The horns on the head were twisted. Wide mouth located at the front of the skull; teeth are short, numerous, and arranged in many rows. There are teeth in both jaws. The tail is typically short and does not have a serrated spine. The colour of the skin is smooth and gray-brown on top and white on the bottom.

12. *Aetomylaeus nichoffi*

Phylum: Chordata, Class: Chondrichthys, Order: Rajiformes, Family: Mylobatidae, Genus: *Aetomylaeus*, Species: *A. nichoffi*

The disc-shaped and somewhat rhomboid in shape. teeth in three rows, lateral narrow and middle broader. There is an orbital horn. The spiral is twice as large as the eye. The origin of the dorsal fin is opposite the pelvic base. Caudal spine absent. Back dark brown with three to five transverse or horizontal grey bands, and big, closely spaced spherical greyish patches in the back.

13. *Narke dipterygia*

Order: Torpediniformes, Family: Torpedinidae, Genus: *Narke*, Species: *N. dipterygia*

Disc almost circular. Only one dorsal fin. Tail short. Colour: Brown above with diffuse blackish clouding medially.

Discussion

India is one of the leading elasmobranch fishing countries in the world (Last *et al.* 2006). On India's south coast, 65 ray fish species predominated. (Akhilesh and Kizhakudan *et al.* 2014), with decreasing catch data in recent decades (CMFRI 2000-2018) [11]. In general, ray fish were captured by trawl nets (Akhilesh KV *et al.*, 2018), due to its lack of selectivity of the gears used for trawling (Kumar *et al.*, 2006) [13]. Ray fishes are economically significant as food fish and for their ornamental value (Brisset *et al.*, 2006) [14]. In the current study, 13 different species of ray fish were observed. Day (1878) reported a total of 19 rays. Misra (1952) [16] noticed 20 rays in the Indian seas. Talwar and Kacker (1984) [17] reported 76 species of commercially important elasmobranchs. Devadoss (1983–84) [18] reported the

stingrays from Parangipettai waters, while Raje *et al.* (2002) [2] listed 32 species of rays from Indian seas.

In the present study, the Dasyatidae family included 5 species, the Narcinidae family included 3 species, the Myliobatidae family included 2 species, the Gymnuridae family included 1 species, the Mobulidae family included 1 species and the Torpedinidae family contained one species, all discovered and documented in the current observation (Mudasalodai). Ramaiyan *et al.* (1987) identified 12 ray fishes in Parangipettai coastal waters, and Purushothaman *et al.* (2015) identified three species. In the present study, the dominant species recorded were from the Dasyatidae family, Narcinidae family, Myliobatidae family, Gymnuridae family, Torpedinidae family, and Mobulidae family, respectively.

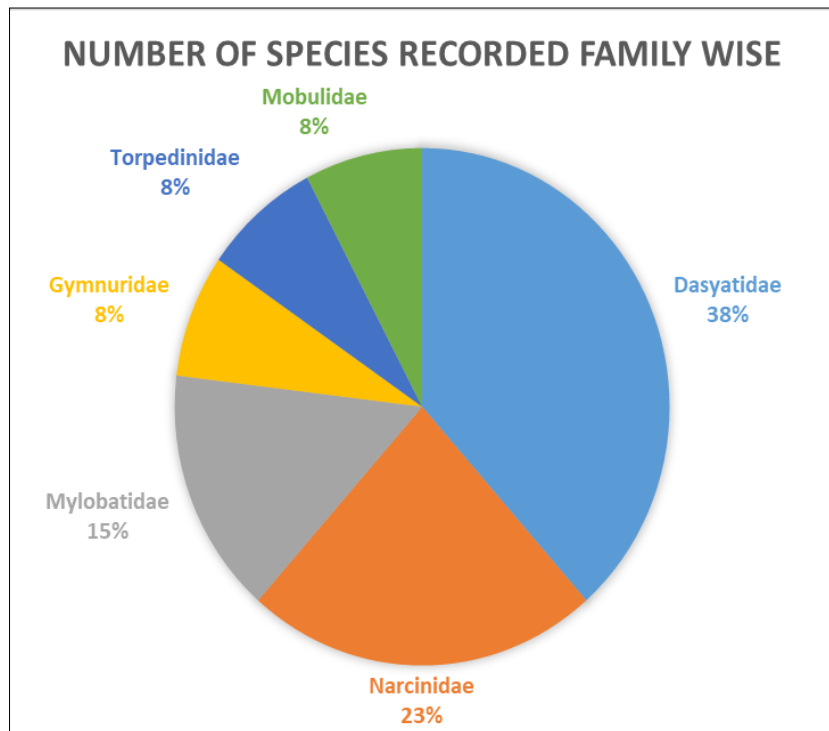


Fig 1

Table 1: Checklist of ray fishes recorded in Mudasalodai fish landing centre, Tamil Nadu, India.

Scientific Name	Family	IUCN
<i>Narcine timlei</i>	Narcinidae	Vulnerable
<i>Narcine brunnea</i>	Narcinidae	Least concern
<i>Narcine prodorsalis</i>	Narcinidae	Endangered
<i>Himantura imbricata</i>	Dasyatidae	Vulnerable
<i>Himantura jenkinsii</i>	Dasyatidae	Vulnerable
<i>Himantura uarnak</i>	Dasyatidae	Endangered
<i>Dasyatis zugei</i>	Dasyatidae	Vulnerable
<i>Pastinachus sephen</i>	Dasyatidae	Near Threatened
<i>Aetobatus narinari</i>	Myliobatidae	Endangered
<i>Aetomylaeus nichofii</i>	Myliobatidae	Vulnerable
<i>Narke dipterygia</i>	Torpedinidae	Vulnerable
<i>Mobula diabolus</i>	Mobulidae	Threatened
<i>Gymnura poecilura</i>	Gymnuridae	Vulnerable

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Conclusion

The study showed the result of Checklist of ray fishes recorded in Mudasalodai fish landing centre, Tamil Nadu, India. Some of the commercially important species in the extinction due to over fishing and over exploitation of the fishery resources.

Therefore the present study Checklist of ray fishes recorded in Mudasalodai fish landing centre helpful for the future studies.

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