

# Elasmobranch Fishery along Odisha Coast – An Overview

Subal Kumar Roul<sup>1,\*</sup>, Shubhadeep Ghosh<sup>2</sup>, Shoba J. Kizhakudan<sup>3</sup>, Sujitha Thomas<sup>4</sup> and Prathibha Rohit<sup>4</sup>

<sup>1</sup>Digha Regional Station of ICAR-Central Marine Fisheries Research Institute, Digha – 721 441, West Bengal, India

<sup>2</sup>Visakhapatnam Regional Centre of ICAR-Central Marine Fisheries Research Institute, Visakhapatnam–530 003, Andhra Pradesh, India

<sup>3</sup>Madras Research Centre of Central Marine Fisheries Research Institute, Chennai – 600 028, Tamil Nadu, India

<sup>4</sup>Mangalore Research Centre of ICAR-Central Marine Fisheries Research Institute, Mangaluru–575 001, Karnataka, India

\*E-mail: subalroul@gmail.com

## Abstract

Elasmobranch are a meagre component of the total marine fish landings of Odisha. Landings data of elasmobranchs during 1976-2020 revealed a declining trend with highest recorded in 1979 (4331 t) and lowest in 2018 (308.6 t). In 2020, the estimated landings were 2042 t, registering an increase of about 76% compared to the previous year. Being a non-targeted resource, the elasmobranch fishery comprises sharks, rays and guitarfishes. During the present investigation, 46 species were recorded in landings along the coast. The rays dominated the elasmobranch fishery contributing about 71%, followed by sharks (27%) and guitarfishes (2%) during 2020. Species-wise catch analysis during the year showed *Gymnura poecilura* as the highest contributor of 569 t (30%) followed by *Maculabatis gerrardi* 465 t (23%), *Scoliodon laticaudus* (267 t, 13%), *Maculabatis spp.* (236 t, 12%), *Brevitrygon imbricata* (117 t, 6%) and *Sphyrna lewini* (105 t, 5%). The elasmobranch fishery peaks during the October -December period and lowest landings during the April-June period coinciding with the monsoon fishing ban period. Mechanised sector contributed 93% of the volumes landed and mainly in bottom trawls, followed by motorised (6%) and non-mechanised (1%) sectors.. Due to less demand in local markets, most catches were sent in iced condition to Kochi, Bangalore, Chennai, Delhi, Howrah and Digha by road, immediately after auction.

*Key words:* Odisha, elasmobranch fishery, sustainability

## Introduction

The elasmobranchs comprising sharks, rays, guitarfish and skates are a key group of marine predators, that play an important role in maintaining a healthy ecosystem. Sustainability of elasmobranch fisheries is well recognized globally and a number of studies associating declines shark and ray populations to fishing pressure has been increasing in various regions of the world (Jabado and Spaet, 2017). They are comparatively more vulnerable to exploitation pressure than teleost due to their typical K-strategy life history traits such as slow maturation, greater longevity, and low fecundity. Odisha has a long coast line of 480 km and a

continental shelf area of 25000 km<sup>2</sup>, extending from east of Subarnarekha River mouth, bordering West Bengal to the Bahuda River mouth at Sunapur, bordering Andhra Pradesh with six coastal districts . This includes Ganjam (60 Km), Puri (155 Km), Jagatsinghpur (67 Km) (Fig.1), Kendrapara (68 Km), Bhadrak (50 Km) and Balasore (80 Km). Although there is no targeted fishery for elasmobranchs along Odisha coast estimated landings show declining trend and contributed nearly 4% of the average marine fish landings in the state during 1976-2020. Study on elasmobranch diversity along the Odisha coast is limited to a few literatures (Barman et al., 2007; Roy et al. 2019) and the present study attempted to address this knowledge gap.

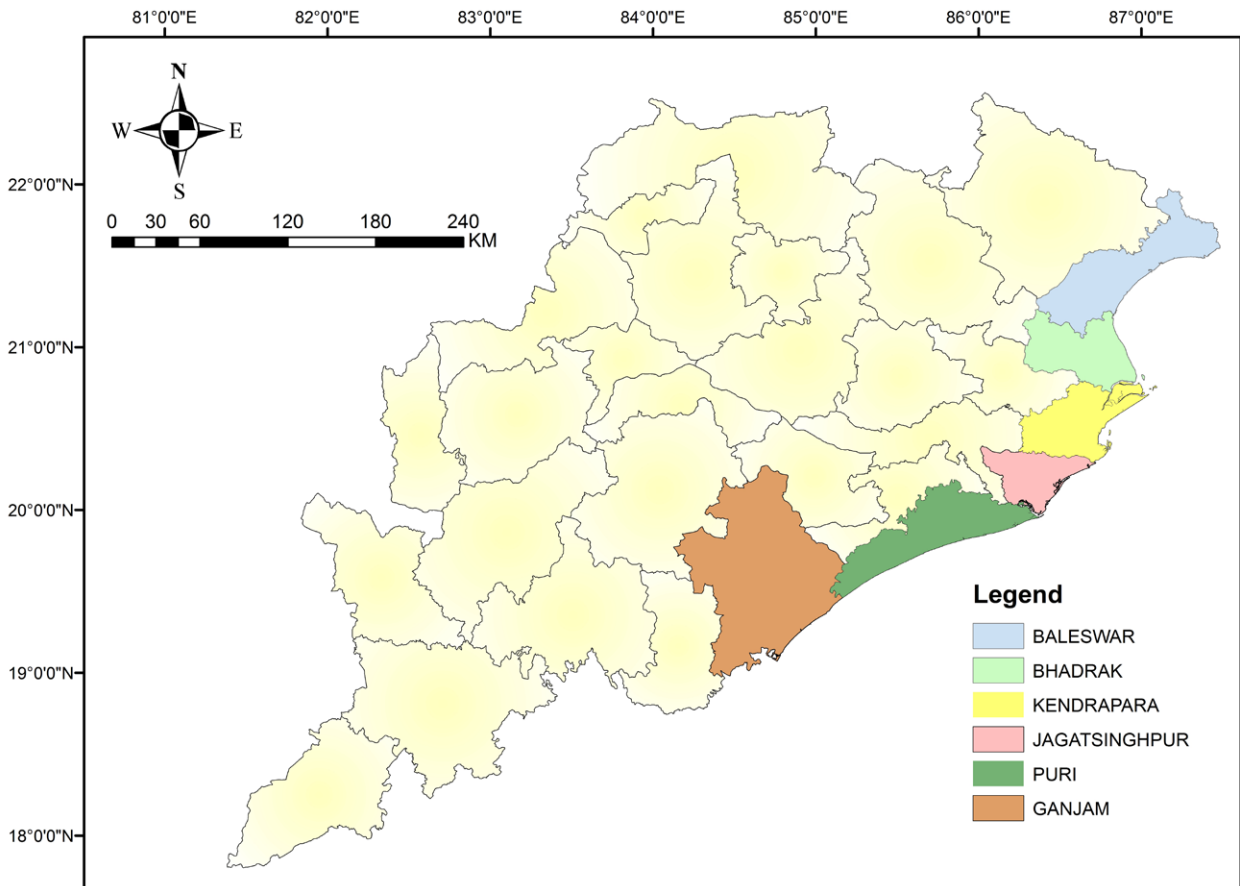


Fig.1. Coastal districts of Odisha monitored for elasmobranch landings

## Fishery trends

The elasmobranchs landings in Odisha coast fluctuated between 2974 t in 1976 to 2042 t in 2020 with an average of 2134 t (Fig. 2). The landings during the period has shown a declining trend with highest landings were recorded in 1979 (4331 t) and lowest in 2018 (309 t). The elasmobranch landing during 2020 has shown an increase of 76% compared to previous year landings

(1163 t) and being a non-targeted resource, it contributed ~ 1% to the total marine fish landings of Odisha coast.

Ray landings fluctuated between 917 t in 1981 to 1443 t in 2020 with average of 748 t (Fig. 3). The landings during the period has shown an increasing trend, highest landings were recorded in 2001 (1971 t) and lowest in 1983 (106 t). In 2020, rays constituted 71% of the state total elasmobranch landings, registering an increase

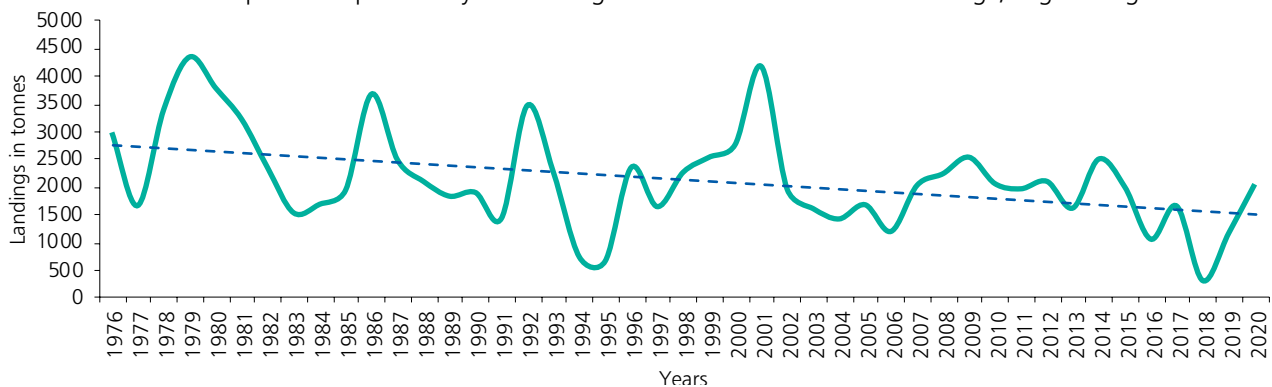


Fig. 2. Catch trend of elasmobranchs along Odisha coast during 1976-2020

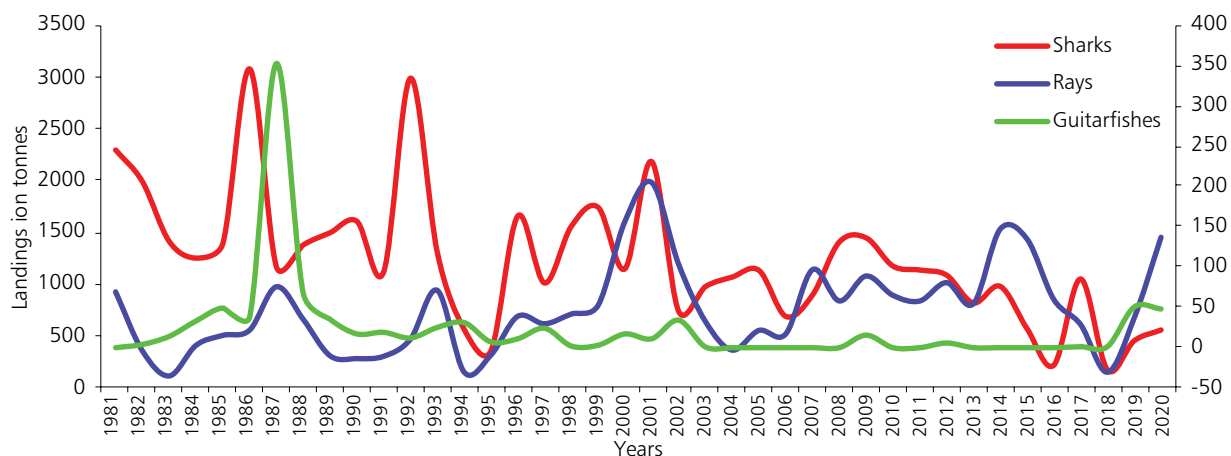


Fig. 3 Catch trend of sharks, rays and guitarfishes along Odisha coast during 1981-2020

of 117% compared to 2019 (666 t). In case of sharks, landings fluctuated between 2293 t in 1981 to 551 t in 2020 with an average of 1227 t (Fig. 3). The landings during the period has shown a decreasing trend, highest landings were recorded in 1986 (3077 t) and lowest of 166 t in 2018. In 2020, sharks contributed 27% of the state total elasmobranch landings, registering an increase of 23% compared to 2019 (447t). Similar declining trend was also observed for guitarfishes where it forms a fishery only in certain years with average landings of 23 t. Their landings were peaked in 1987 (351 t) after which the catch has been declining. In 2020, guitarfish landings were recorded to 50 t, contributing nearly 2% of the state total elasmobranch landings and registering a decrease of 5% compared to 2019 (48 t).

## Species composition

Altogether 46 species of elasmobranchs were recorded in landings caught by various fishing gears along Odisha coast (Table 1). Among the species, major share was contributed by *Gymnura poecilura* (569 t, 28%), *Maculabatis gerrardi* (455 t, 23 %), *Scoliodon laticaudus* (267 t, 13%), *Maculabatis spp.* (236 t, 12%), *Brevitrygon imbricata* (117 t, 6%) and *Sphyrna lewini* (105 t, 5%).

In 2020 rays dominated the elasmobranch fishery followed by sharks and guitarfish along Odisha coast. The major ray species landed along the coast during the period were *Gymnura poecilura* (39%), *Maculabatis gerrardi* (32%), *Maculabatis spp.* (16%), and *Brevitrygon imbricata* (8%)

Table 1. List of elasmobranch species recorded along Odisha coast during 2017-2020

Sl.No.	Group	Family	Species	Common name
1	Butterfly rays	Gymnuridae	<i>Gymnura poecilura</i> (Shaw 1804)	Long-tailed butterfly ray
2	Stingrays	Dasyatidae	<i>Hemirhynchus bennettii</i> (Müller & Henle 1841)	Bennett's stingray
3			<i>Maculabatis gerrardi</i> (Gray, 1851)	Sharpnose stingray
4			<i>Maculabatis bineeshi</i> Manjaji-Matsumoto & Last, 2016	Short-tail whipray
5			<i>Maculabatis cf. randalli</i> (Last, Manjaji-Matsumoto & Moore 2012)	Arabian banded whipray
6			<i>Maculabatis pastinacoides</i> (Bleeker, 1852)	Round whip ray
7			<i>Brevitrygon imbricata</i> (Bloch & Schneider 1801)	Bengal whipray
8			<i>Pastinachus gracilicaudus</i> Last & Manjaji-Matsumoto 2010	Narrowtail stingray
9			<i>Pastinachus ater</i> (Macleay, 1883)	Broad cowtail ray
10			<i>Pteroplatytrigon violacea</i> (Bonaparte 1832)	Pelagic stingray

11			<i>Neotrygon indica</i> Pavan Kumar, Kumar, Pitale, Shen & Borsa 2018	Indian Ocean blue-spotted maskray
12			<i>Himantura undulata</i> (Bleeker 1852)	Leopard whipray
13			<i>Himantura uarnak</i> (Gmelin 1789)	Honeycomb stingray
14			<i>Urogymnus polylepis</i> (Bleeker 1852)	Giant freshwater whipray
15			<i>Pateobatis bleekeri</i> (Blyth 1860)	Bleeker's whipray
16	Pacific eagle rays	Aetobatidae	<i>Aetobatus ocellatus</i> (Kuhl 1823)	Ocellated eagle ray
17	Cownose rays	Rhinopterae	<i>Rhinoptera javanica</i> Müller & Henle, 1841	Flapnose ray
18			<i>Rhinoptera jayakari</i> Boulenger, 1895	Oman cownose ray
19	Devilrays	Mobulidae	<i>Mobula mobular</i> (Bonnaterre 1788)	Devil fish
20	Electric rays	Torpedinidae	<i>Torpedo panthera</i> Olfers 1831	Panther electric ray
21			<i>Torpedo fuscomaculata</i> Peters, 1855	Black-spotted torpedo
22	Sleeper rays	Narkidae	<i>Narke dipterygia</i> (Bloch & Schneider 1801)	Numbray
23	Numbfishes	Narcinidae	<i>Narcine timlei</i> (Bloch & Schneider 1801)	Spotted numbfish
24			<i>Narcine prodorsalis</i> Bessednov 1966	Tonkin numbfish
25	Giant guitarfishes	Glaucostegidae	<i>Glaucostegus granulatus</i> (Cuvier 1829)	Granulated guitarfish
26			<i>Glaucostegus obtusus</i> (Mülle & Henle 1841)	Widenose guitarfish
27			<i>Rhinobatos annandalei</i> Norman 1926	Annandale's guitarfish
28			<i>Rhinobatos lionotus</i> Norman 1926	Smoothback guitarfish
29			<i>Rhina ancylostomus</i> Bloch & Schneider 1801	Bowmouth guitarfish
30	Sawfishes	Pristidae	<i>Pristis pristis</i> (Linnaeus, 1758)	Common sawfish
31	Whale shark	Rhincodontidae	<i>Rhincodon typus</i> Smith, 1828	Whale shark
32	Hammerhead, bonnethead, or scoophead sharks	Sphyrnidae	<i>Sphyrna lewini</i> (Griffith & Smith 1834)	Scalloped hammerhead
33			<i>Sphyrna zygaena</i> (Linnaeus, 1758)	Smooth hammerhead
34	Houndsharks	Triakidae	<i>Iago cf. omanensis</i> (Norman 1939)	Bigeye houndshark
35	Weasel sharks	Hemigaleidae	<i>Hemipristis elongata</i> (Klunzinger 1871)	Snaggletooth shark
36	Bamboo sharks	Hemiscylliidae	<i>Chiloscyllium griseum</i> Müller & Henle, 1838	Grey bambooshark
37			<i>Chiloscyllium burmense</i> Dingerkus & DeFino, 1983	Burmese bamboo shark
38	Thresher sharks	Alopiidae	<i>Alopias pelagicus</i> Nakamura 1935	Pelagic thresher
39	Requiem sharks	Carcharhinidae	<i>Galeocerdo cuvier</i> (Péron & Lesueur 1822)	Tiger shark
40			<i>Rhizoprionodon acutus</i> (Rüppell 1837)	Milk shark
41			<i>Rhizoprionodon oligolinx</i> Springer 1964	Grey sharpnose shark
42			<i>Scoliodon laticaudus</i> Müller & Henle 1838	Spadenose shark
43			<i>Carcharhinus amblyrhynchoides</i> (Whitley, 1934)	Graceful shark
44			<i>Carcharhinus leucas</i> (Müller & Henle, 1839)	Bull shark
45			<i>Carcharhinus sorrah</i> (Müller & Henle, 1839)	Spot-tail shark
46	Shortnose chimaeras	Chimaeridae	<i>Hydrolagus cf. africanus</i> (Gilchrist, 1922)	African chimaera

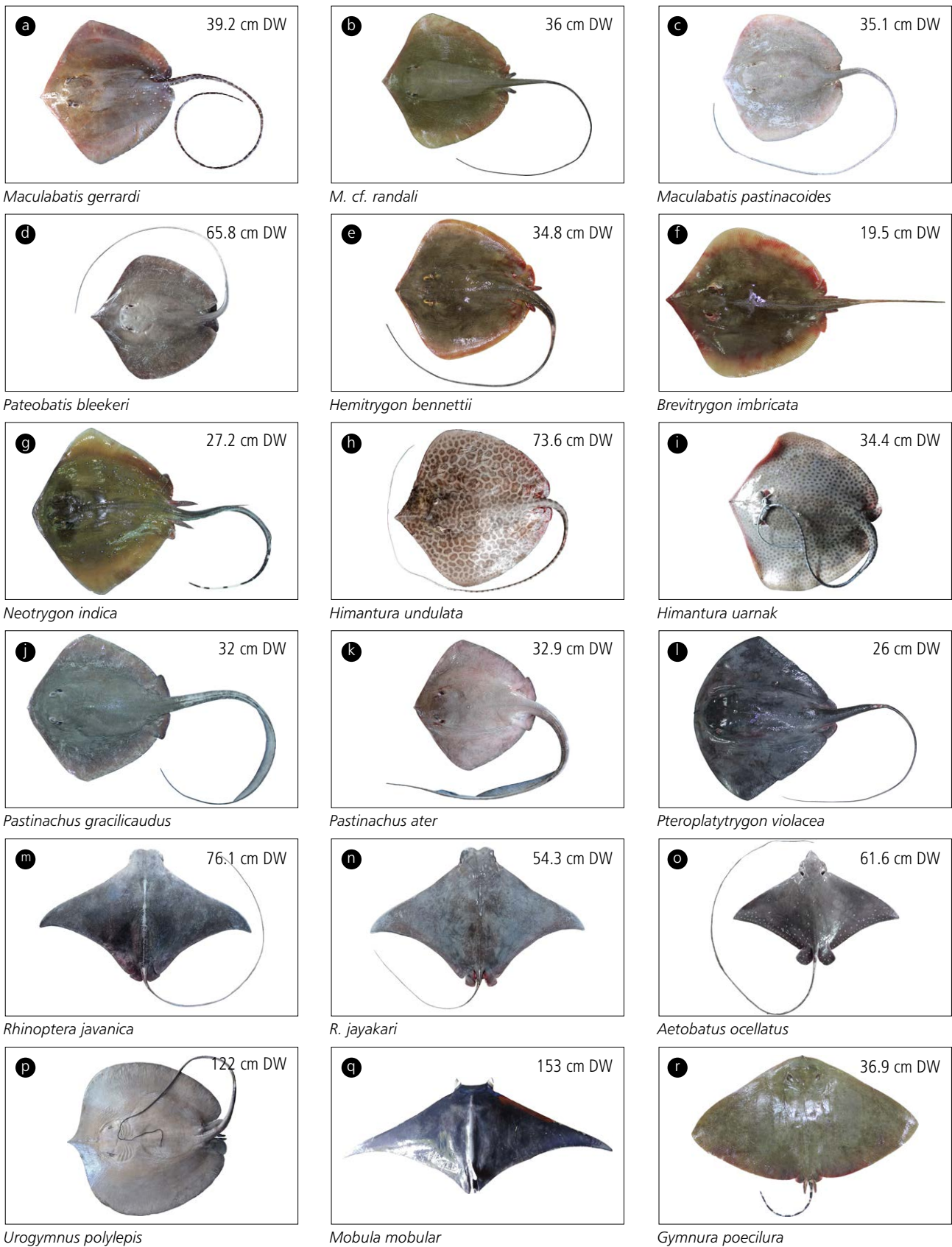


Fig. 4 . Species of rays recorded along Odisha coast

(Figs. 4,5, 6 ). Similarly, the major shark species landed along Odisha coast were *Scoliodon laticaudus* (48%), *Sphyrna lewini* (19%), other *Carcharhinus* spp. (12%),

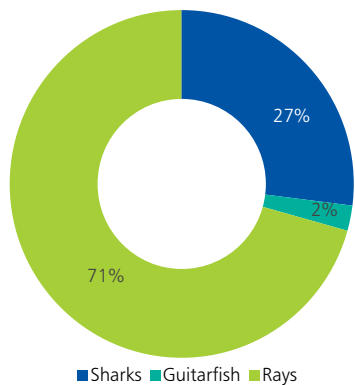


Fig.4. Groupwise contribution to landings of elasmobranchs along Odisha coast in 2020

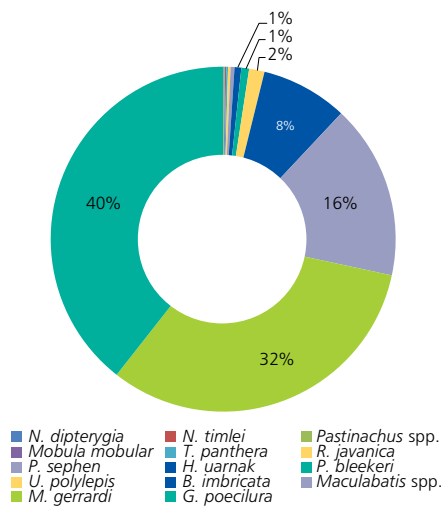


Fig.5. Various species of rays landed in 2020

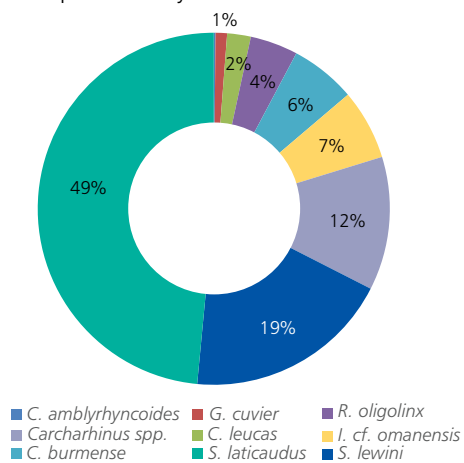
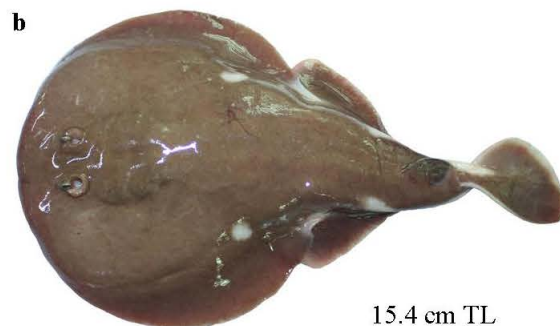


Fig. 7. Species-wise shark landings along Odisha coast during 2020



*Torpedo panthera*



*Narke dipterygia*



*Narcine timlei*



*N. prodorsalis*

Fig. 6 Species of electric rays recorded along Odisha coast

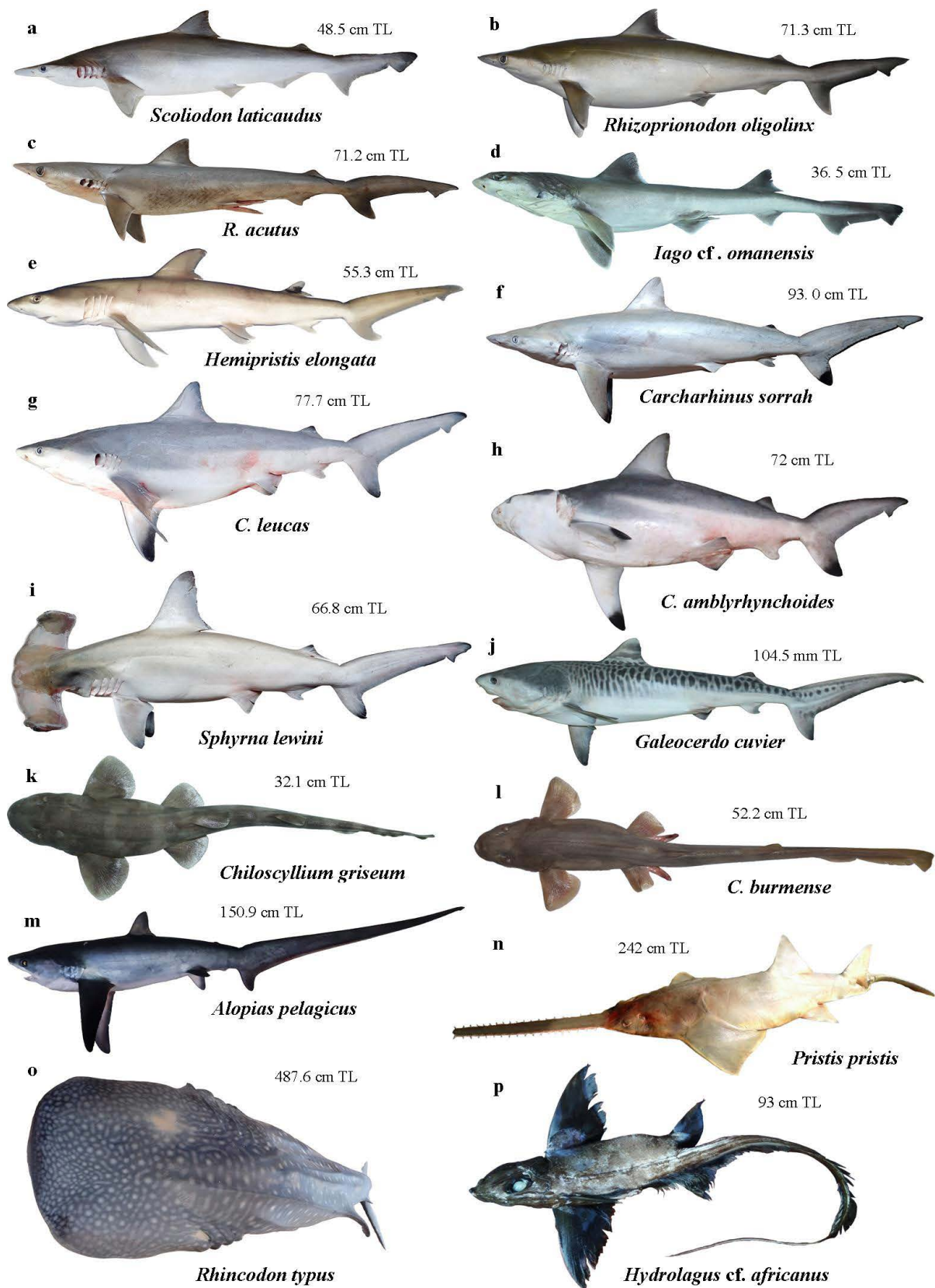


Fig. 8. Species of sharks and sawfish recorded along Odisha coast

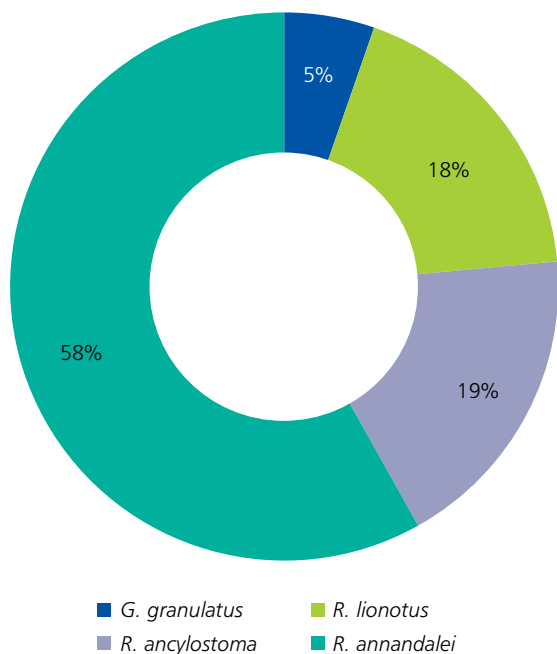


Fig. 9. Species-wise guitarfish landings along Odisha coast during 2020

*lago cf. omanensis* (6%) and *Chiloscyllium burmense* (6%) (Figs.7, 8 ). *Rhinobatos annandalei* is the major species contributing nearly 58% of the state total guitarfish landings (Figs. 9,10).

The elasmobranch fishery attained its peak during October -December contributing about 1040 tonnes (51%) followed by 659 tonnes (32%) during July-September period. During January-March period 315 tonnes (15%) and lowest of 28 tonnes (1%) during April-June (coinciding with the monsoon fishing ban period) was observed along the coast (Fig.11).

Targeted elasmobranch fishery has not been practised by any specialised group or community along the Odisha coast. These resources are mostly caught as incidental or as by-catch while targeting other species, and constituted a part of the multi-species fisheries along the coast. Mechanised sector contributed the highest catch (93%), followed by the motorised (6%) and the non-mechanised (1%) sectors (Fig.12). The fishing methods used to catch

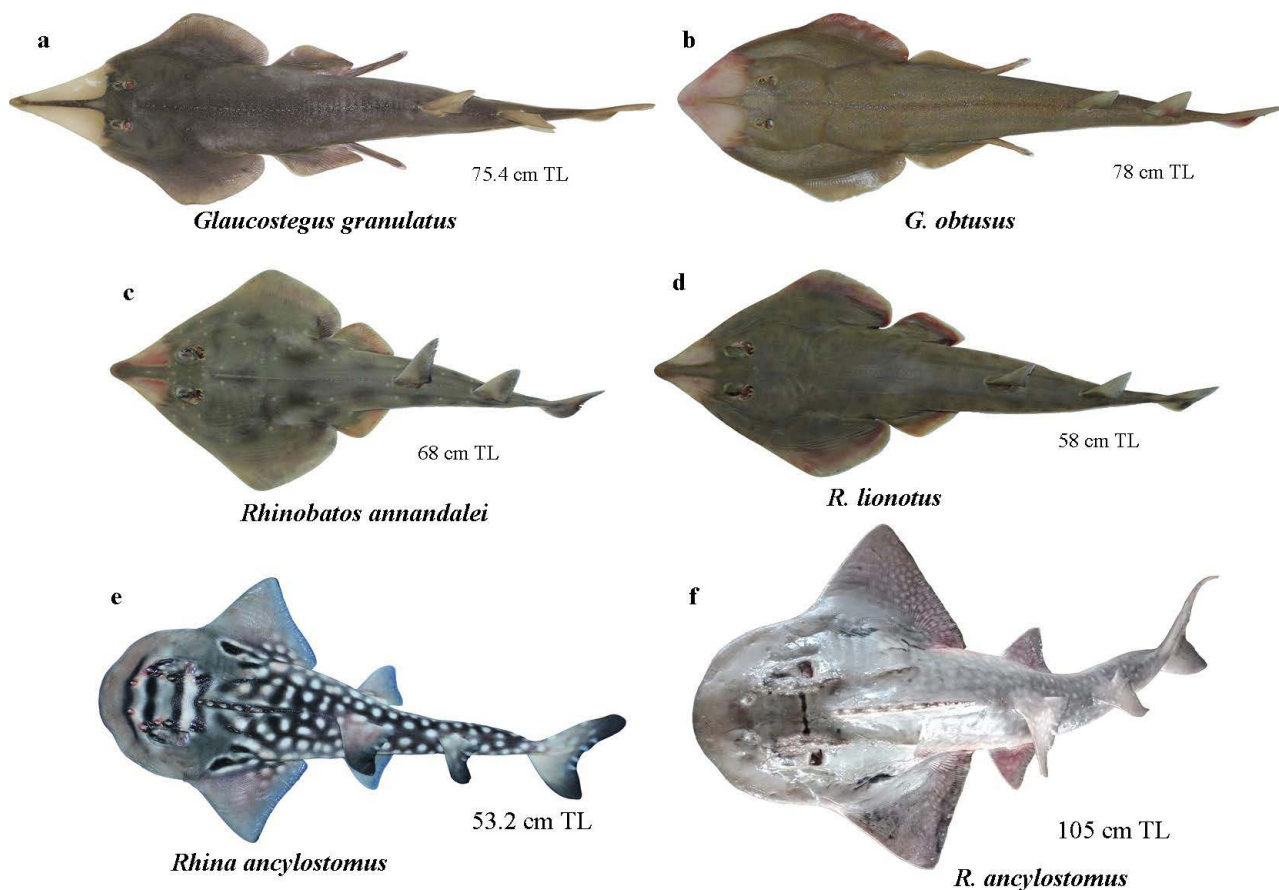


Fig. 10. Species of guitarfish recorded along Odisha coast



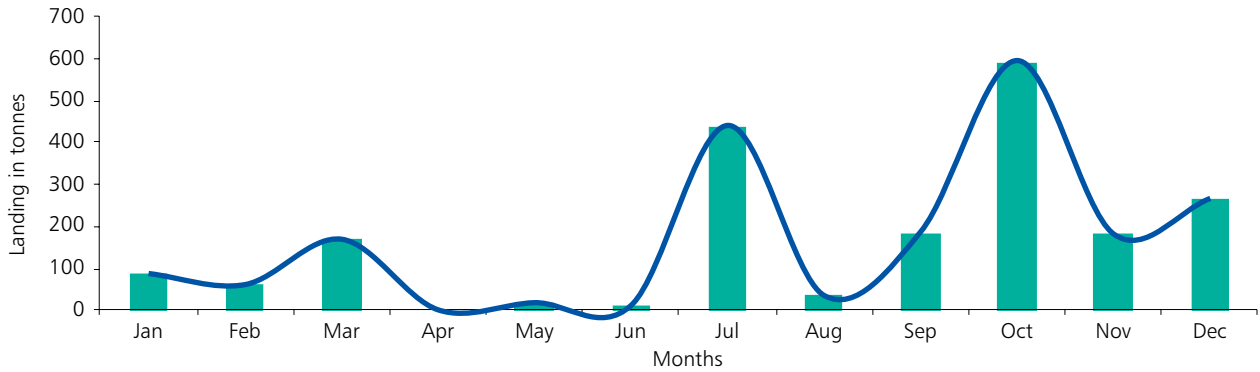


Fig. 11. Month-wise landings of elasmobranch resources of Odisha coast in 2020.

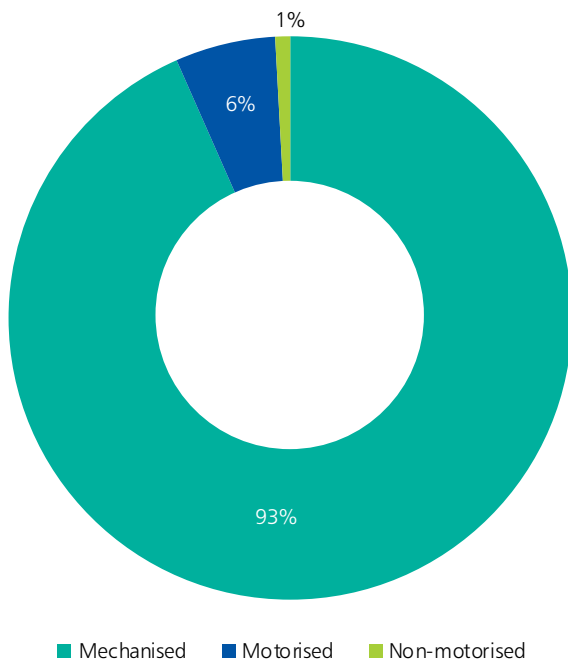


Fig. 12. Sectorwise contribution to the total elasmobranch landings of Odisha coast during 2020

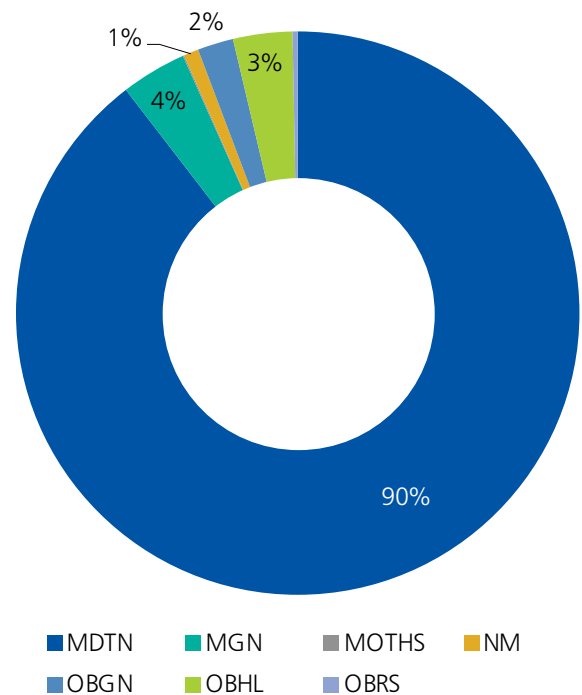


Fig. 13. Gearwise contribution to the total elasmobranch landings of Odisha coast during 2020

elasmobranchs are bottom trawls, gillnets, longlines, and ringseines. Among them, bottom trawls contributed the highest of about 90% of the total elasmobranch landings (Fig. 13).

Due to little preference for elasmobranchs in local markets in Odisha, most of the catches were sent to Cochin, Bangalore, Chennai, Delhi, Howrah and Digha by road in iced condition, immediately after auction at the landing sites. Sometimes, large sized sharks and rays were cut into pieces, packed in ice and transported.

*MDTN-Multiday trawl net, MGN-Mechanised gill net, MOTHS-Mechanised other gears, NM-Non-mechanised, OBGN-Outboard gill net, OBHL- Outboard Hook and line, OBRS-Outboard ring seine*

## References

Jabado, R. W. and Spaet, J. L. 2017. *Fish Fish.*, 18(6): 1096-1118.  
 Kizhakudan, S. J. et al., *CMFRI special publication No.132*. ICAR-Central Marine Fisheries Research Institute, Kochi, 104 pp.