

Research Article

Ichthyofauna species diversity of Gulf of Kachchh, Gujarat, India Case study: Jakhau and Mandvi coast

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Abstract: A checklist of marine fishes from the coastal areas of Jakhau and Mandvi, Gulf of Kachchh, west coast of Gujarat, India, was compiled through the fish collection from December 2013 to March 2015. On examination, a total of 20 orders, 47 families and 96 species were recorded. Of these four species were recorded from class Elasmobranchii and 92 species from class Actinopterygii. The Family Carangidae showed species dominance with 10 individuals, while the order Eupercaria is dominated with 18 numbers of species. The checklist contains 10 Not evaluated species, 6 Data deficient species, 68 Least concern species, 5 near-threatened species, 4 Vulnerable, 2 Endangered, and 1 Critically endangered species as per IUCN red list records. Of the total 96 species, the Jakhau sampling site reported 74 species; Mandvi sampling site reported 77 species, while 54 species were reported common from both the sites. *Deveximentum indicium* (Monkolprasit, 1973) was reported for the first time from Jakhau sampling station of Gulf of Kachchh, Gujarat. Further research is needed for better understanding and conservation of such species. The detailed study of fish habitats in the Kachchh Gulf will provide an insight into diversity and exposures to habitat destruction.

Keywords: Ichthyofauna, Species diversity, Gulf of Kachchh, India.

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Introduction

Fish constitute almost half of the total number of vertebrates (54,711) in the world (Gopi & Mishra 2015). Around the world, a total of 35,845 valid fish species is enlisted, including 18,078 valid freshwater fish species (Fricke et al. 2021). India possesses fish diversity of 2456 species, of which, 930 species are associated with freshwater and 1526 with the marine ecosystem (Joshi et al. 2018). India is one of the mega-diversity rich nation in the world known for its species diversity (Gopi & Mishra 2015). India is blessed with a coastline of 8,118 km of which the state of Gujarat contributes around 1600 km (Abraham et al. 2020).

The Gulf of Kachchh, one of the rich biodiverse zones situated on the North-west coast of India with an approximate length of 170km (Parmar et al. 2015).

Gulf of Kachchh has a fishing area of 5000 km², as it lies below the Kachchh district and above Jamnagar district (Katira & Kardani 2017). The Gulf nurtures a distinct pattern of biotic accumulation with higher species richness, which includes rare and endangered species (Ramamoorthy et al. 2012). Out of 2456 species reported, 402 fish species are reported from the Gulf of Kachchh (Parmar et al. 2015).

However, the fish diversity connected to Gulf in India is still unknown. To determine fish diversity, studies have been carried out from various coasts in the Gulf of Kachchh. Sikka coast of Jamnagar reported 112 ichthyofauna species belonging to 50 families, 12 orders, and 84 genera (Katira & Kardani 2017). Similar diversity study from the vicinity of Jamnagar Marine National Park, Gulf of Kachchh reported 109 ichthyofauna species belonging to 58



Fig.1. Study area along the Gulf of Kachchh, Gujarat, India.

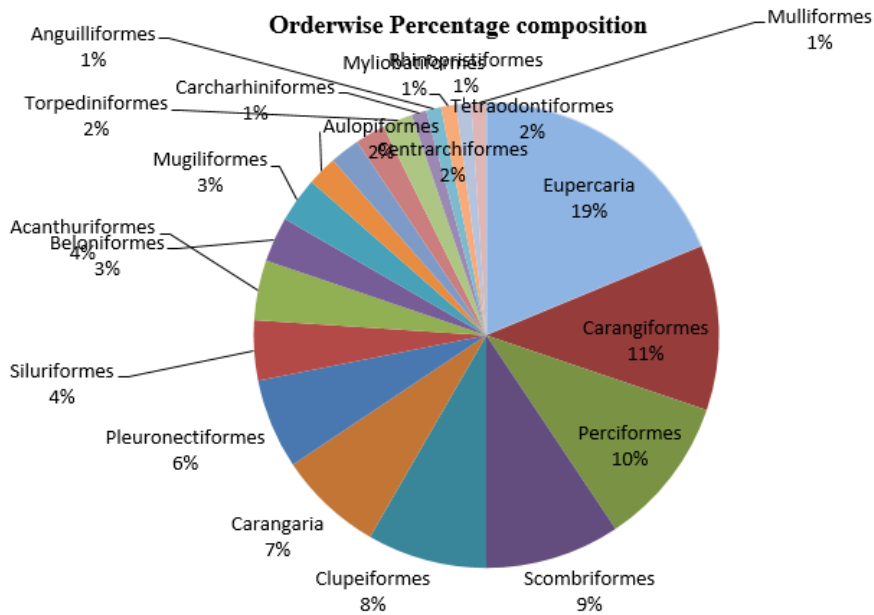


Fig.2. Graphical representation of Order wise percentage composition - Gulf of Kachchh, Gujarat, India from December 2013 to March 2015.

families, 19 orders, and 93 genera (Brahmane et al. 2014). Veraval coast in the Gulf of Kachchh reported 120 ichthyofauna species belonging to 62 families and 18 orders (Joshi et al. 2018). However, no information regarding ichthyofaunal diversity from Jakhau and Mandvi coast was available, concerning the Gulf of Kachchh. In Gujarat, marine fishing has emerged as an important economic activity concerning food security, employment generation, poverty reduction, and foreign exchange earnings.

Apart from the economic benefits obtained from biodiversity, the conservation of species is of importance as they stabilize the ecosystems, maintain aesthetic values, and environmental qualities (Ehrlich & Wilson 1991). So, the study was carried out to study the fish diversity in the selected fishing harbour area of Gulf of Kachchh to develop a list of economically important fishes and to draw conservation plans for the fish with no or less economic value.

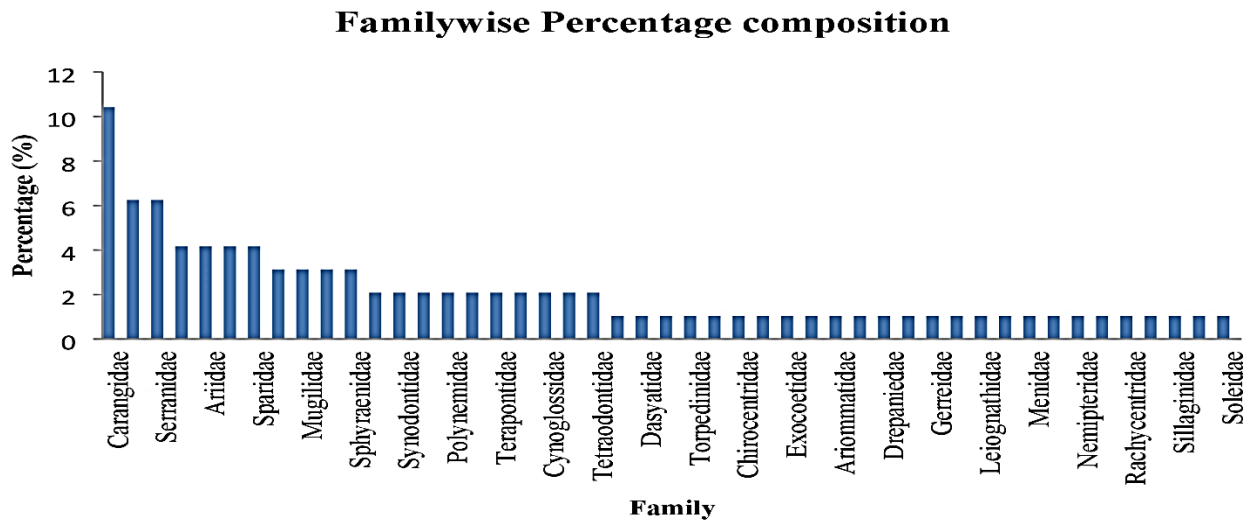


Fig.3. Graphical representation of Family wise percentage composition- Gulf of Kachchh, Gujarat, India from December 2013 to March 2015.

Materials and Methods

The present study was carried out along the western coast of Gujarat between the Kachchh and Saurashtra peninsula. The sites selected to study fish species diversity were Jakhau ($23^{\circ}13'59.88''N$ $68^{\circ}34'35.06''E$) and Mandvi ($22^{\circ}49'25.83''N$ $69^{\circ}21'15.53''E$) situated in Gulf of Kachchh, Gujarat, India (Fig. 1). A random collection of fish specimens from the study area was carried out from December 2013 to March 2015. To study the ichthyofauna diversity, the specimens were collected from the local fish market, fish landing centres, and field visits in the Gulf of Kachchh. The majority of fish specimens were collected on the field using a fishing trawler (30m) operated with diesel engines (80-160hp). The trawl nets used for the fish collection were made of multifilament nylon and HDPE. The length of trawl nets used was 50m to 100m and fishing depth of 30m to 50m. The mesh size of the trawl net was 15cm-15cm at the headend, reduced to 4cm-4cm at codend. The local fishermen from Jakhau use the Pilana boat (<9m) for fishing, while the commercial fishermen from Jakhau and Mandvi use fishing trawlers. The fish samples were collected from the depth of 30m to 50m depending upon the carrying capacity of the boat.

The collected specimens were photo-documented on-site, preserved in ice-box, transferred to the

laboratory within 24h, and finally preserved using 10% formalin (Brahmane et al. 2014). Identification of collected specimens was carried out till species taxon using standard taxonomic keys (Day 1888; Jhingran 1982; Talwar & Kacker 1984). The accepted English name and scientific name were determined from fishbase.org <http://www.fishbase.org/search> (Froese & Pauly 2021) and Eschmeyer's Catalog of Fishes (Fricke et al. 2021). The IUCN red list (IUCN 2021) was used to determine the conservation status of studied species. The categories are as follows: NE, not evaluated; DD, data deficient; LC, least concern; NT, near threatened, VU, vulnerable; EN, endangered; CR, critically endangered. The checklist of species studied along with local names is shown in Table 1.

Results and Discussion

A total of 96 fish species, representing 47 families in 20 orders, from the coast of Jakhau and Mandvi, Gulf of Kachchh were identified from a total of 423 collected specimens during the study (Table 1) (Figs. 4-11).

The class Chondrichthyes represented 4.16% (4 species, 4 orders), while class Osteichthyes represented 95.83% (92 species, 16 orders) of total fish species studied.



Fig.4. The representative Ichthyofauna encountered in the present study: A, *Scoliodon laticaudus*; B, *Maculabatis gerrardi*; C, *Rhynchobatus djiddensis*; D, *Torpedo sinuspersici*; E-F, *Congresox talabonoides*; G, *Chirocentrus nudus*; H, *Hilsa kelee*.



Fig.5. The representative Ichthyofauna encountered in the present study: A, *Sardinella longiceps*; B, *Tenuulosa ilisha*; C, *Thryssa mystax*; D, *Coilia dussumieri*; E, *Ilisha Megaloptera*; F, *Netuma thalassinus*; G, *Nemapteryx caelata*; H, *Harpadon nehereus*; I, *Saurida tumbil*; J, *Strongylura leiura*.



Fig.6. The representative Ichthyofauna encountered in the present study: A-B, *Strongylura strongylura*; C, *Exocoetus volitans*; D-E, *Kumococius rodericensis*; F, *Platycephalus indicus*; G, *Scorpaenodes guamensis*; H, *Mugil cephalus*; I, *Planiliza klunzingeri*; J, *Planiliza planiceps*; K, *Ariomma indica*.

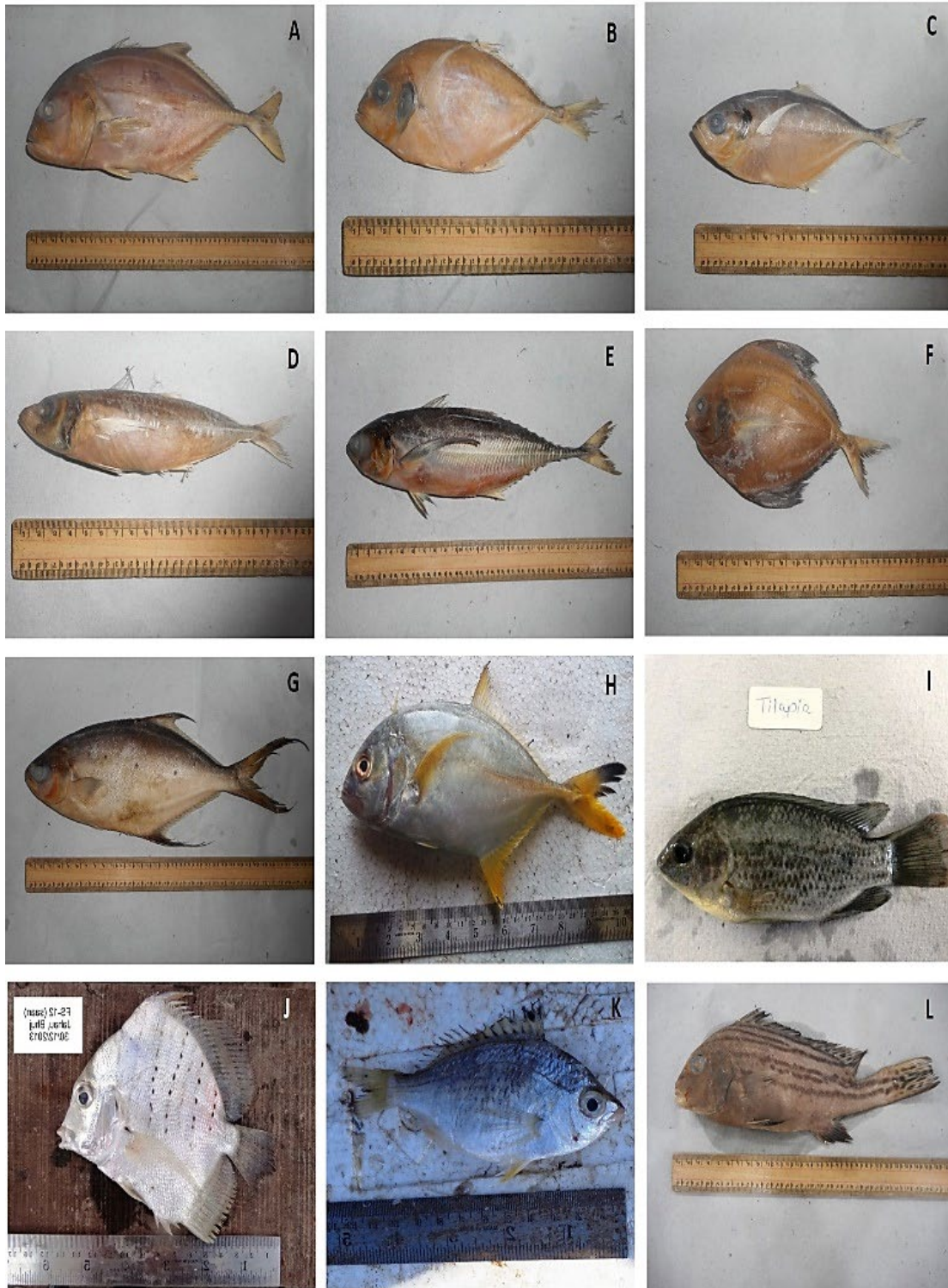


Fig.7. The representative Ichthyofauna encountered in the present study: A, *Carangoides chrysophrys*; B, *Caranx ignobilis*; C, *Caranx sexfasciatus*; D, *Decapterus russelli*; E, *Megalaspis cordyla*; F, *Parastromateus niger*; G, *Trachinotus bailloni*; H, *Trachinotus blochii*; I, *Oreochromis mossambicus*; J, *Drepane punctate*; K, *Gerres oyena*; L, *Diagramma pictum*.



Fig.8. The representative Ichthyofauna encountered in the present study: A, *Pomadasys guoraca*; B, *Pomadasys maculatus*; C, *Lactarius lactarius*; D, *Deveximentum indicium*; E, *Lethrinus microdon*; F, *Mene maculata*; G, *Upeneus sulphureus*; H, *Nemipterus japonicus*; I, *Eleutheronema tetradactylum*; J, *Polydactylus mullani*; K, *Priacanthus hamrur*; L, *Rachycentron canadum*.



Fig.9. The representative Ichthyofauna encountered in the present study: A, *Johnius borneensis*; B, *Johnius dussumieri*; C, *Otolithes ruber*; D, *Panna microdon*; E, *Paranibea semiluctuosa*; F, *Protonibea diacanthus*; G, *Rastrelliger kanagurta*; H, *Scomberomorus guttatus*; I, *Epinephelus areolatus*; J, *Epinephelus coioides*; K, *Epinephelus diacanthus*; L, *Epinephelus erythrurus*.



Fig.10. The representative Ichthyofauna encountered in the present study: A, *Epinephelus latifasciatus*; B, *Siganus canaliculatus*; C, *Sillago sihama*; D, *Acanthopagrus berda*; E, *Acanthopagrus arabicus*; F, *Diplodus kotschy*; G, *Sphyræna obtusata*; H, *Sphyræna putnamae*; I, *Pampus argenteus*; J, *Pampus chinensis*; K, *Pelates quadrilineatus*; L, *Terapon jarbua*.

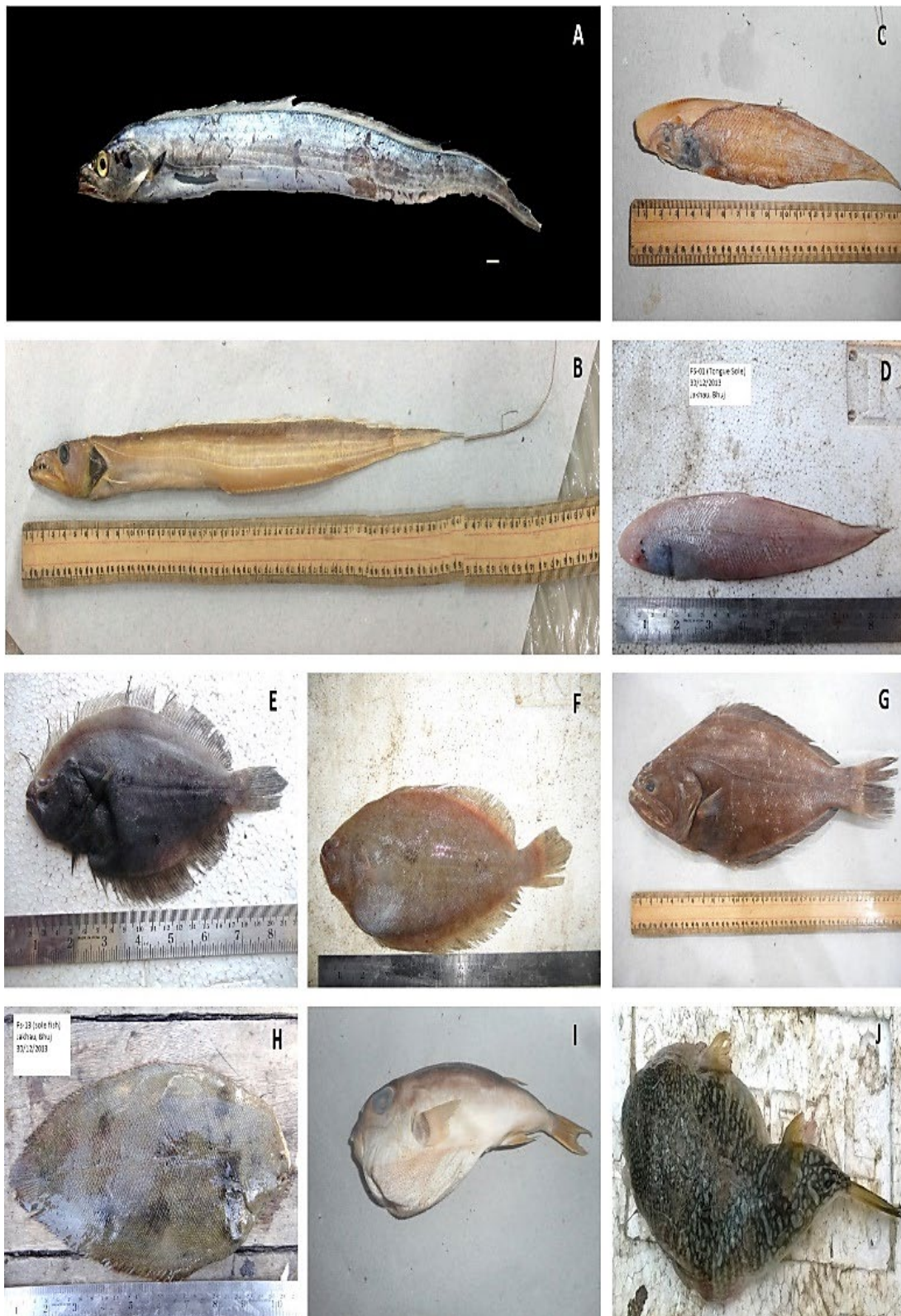


Fig.11. The representative Ichthyofauna encountered in the present study: A, *Lepturacanthus savala*; B, *Trichiurus lepturus*; C, *Cynoglossus macrostomus*; D, *Cynoglossus lingua*; E, *Pseudorhombus arsius*; F, *Pseudorhombus elevatus*; G, *Psettodes erumei*; H, *Brachirus orientalis*; I, *Lagocephalus lunaris*; J, *Takifugu oblongus*.

Table 1. List of marine fish species recorded from Jakhau and Madvi coast of Gulf of Kachchh, Gujarat, India from December 2013 to March 2015.

NO	TAXON	SCIENTIFIC NAME	ENGLISH NAME	JAKHAU	MAN DVI	IUCN RED LIST
Carcharhiniiformes						
1	Carcharhinidae	<i>Scoliodon laticaudus</i> (Müller & Henle, 1838)	Spadenose shark	P	P	NT
Myliobatiformes						
2	Dasyatidae	<i>Maculabatis gerrardi</i> (Gray, 1851)	Sharpnose stingray	P	P	EN
Rhinopristiformes						
3	Rhinidae	<i>Rhynchobatus djiddensis</i> (Forsskål, 1775)	Giant guitarfish	P	A	CR
Torpediniiformes						
4	Torpedinidae	<i>Torpedo sinuspersici</i> (Olfers, 1831)	Variable torpedo ray	P	A	DD
Anguilliformes						
5	Muraenesocidae	<i>Congresox talabonoides</i> (Bleeker, 1853)	Indian pike conger	A	P	NE
Clupeiformes						
6	Chirocentridae	<i>Chirocentrus nudus</i> (Swainson, 1839)	Whitefin wolf-herring	P	P	LC
7	Clupeidae	<i>Escualosa thoracata</i> (Valenciennes, 1847)	White sardine	P	P	LC
8		<i>Hilsa kelee</i> (Cuvier, 1829)	Kelee shad	P	P	LC
9		<i>Sardinella longiceps</i> (Valenciennes, 1847)	Indian oil sardine	P	P	LC
10		<i>Tenulosa ilisha</i> (Hamilton, 1822)	Hilsa shad	P	P	LC
11	Engraulidae	<i>Thryssa mystax</i> (Bloch & Schneider, 1801)	Moustached thryssa	P	P	LC
12		<i>Coilia dussumieri</i> (Valenciennes, 1848)	Goldspotted grenadier	P	P	LC
13	Pristigasteridae	<i>Ilisha megaloptera</i> (Swainson, 1839)	Bigeye ilisha	P	P	LC
Siluriformes						
14	Ariidae	<i>Netuma thalassinus</i> (Rüppell, 1837)	Giant catfish	P	A	LC
15		<i>Nemapteryx caelata</i> (Valenciennes, 1840)	Engraved catfish	A	P	NE
16		<i>Plicofollis dussumieri</i> (Valenciennes, 1840)	Blacktip sea catfish	P	P	LC
17		<i>Hemiaris sona</i> (Hamilton, 1822)	Sona sea catfish	P	P	NE
Aulopiformes						
18	Synodontidae	<i>Harpadon nehereus</i> (Hamilton, 1822)	Bombay-duck	P	P	NT
19		<i>Saurida tumbil</i> (Bloch, 1795)	Greater lizardfish	P	P	LC
Beloniformes						
20	Belonidae	<i>Strongylura leiura</i> (Bleeker, 1850)	Banded needlefish	A	P	LC
21		<i>Strongylura strongylura</i> (vanHasselt, 1823)	Spottail needlefish	P	P	LC
22	Exocoetidae	<i>Exocoetus volitans</i> (Linnaeus, 1758)	Tropical two-wing flyingfish	P	A	LC
Perciformes						
23	Platycephalidae	<i>Grammoplites scaber</i> (Linnaeus, 1758)	Rough flathead	A	P	NE
24		<i>Kumococius rodericensis</i> (Cuvier, 1829)	Spiny flathead	A	P	LC
25		<i>Platycephalus indicus</i> (Linnaeus, 1758)	Bartail flathead/ Indian	P	P	DD
26	Scorpaenidae	<i>Scorpaenodes guamensis</i> (Quoy & Gaimard, 1824)	Guam scorpionfish	P	P	LC
27	Serranidae	<i>Epinephelus areolatus</i> (Forsskål, 1775)	Areolate grouper	P	P	LC
28		<i>Epinephelus coioides</i> (Hamilton, 1822)	Orange spotted grouper	P	P	LC
29		<i>Epinephelus diacanthus</i> (Valenciennes, 1828)	Spiny cheek grouper	P	P	LC
30		<i>Epinephelus erythrurus</i> (Valenciennes, 1828)	Cloudy grouper	A	P	LC
31		<i>Epinephelus latifasciatus</i> (Temminck & Schlegel, 1842)	Striped grouper	A	P	LC
32		<i>Epinephelus polylepis</i> (Randall & Heemstra, 1991)	Smallscaled grouper	P	A	LC
Mugiliformes						
33	Mugilidae	<i>Mugil cephalus</i> (Linnaeus, 1758)	Flathead grey mullet	P	P	LC
34		<i>Planiliza klunzingeri</i> (Day, 1888)	klunzinger's mullet	P	A	VU
35		<i>Planiliza planiceps</i> (Valenciennes, 1836)	Tade gray mullet	P	A	LC
Scombriformes						
36	Ariommatidae	<i>Ariomma indica</i> (Day, 1871)	Indian driftfish	P	A	LC
37	Scombridae	<i>Rastrelliger kanagurta</i> (Cuvier, 1816)	Indian mackerel	P	P	DD
38		<i>Scomberomorus lineolatus</i> (Cuvier, 1829)	Streaked seerfish	P	P	LC
39		<i>Scomberomorus guttatus</i> (Bloch & Schneider, 1801)	Indo-pacific king mackerel	P	P	DD
40		<i>Thunnus albacares</i> (Bonnaterre, 1788)	Yellowfin tuna	P	P	NT

Table 1. Continued.

41	Stromateidae	<i>Pampus argenteus</i> (Euphrasen, 1788)	Silver pomfret	P	P	VU
42		<i>Pampus chinensis</i> (Euphrasen, 1788)	Chinese silver pomfret	P	P	NE
43	Trichiuridae	<i>Lepturacanthus savala</i> (Cuvier, 1829)	Savalai hairtail	P	P	NE
44		<i>Trichiurus lepturus</i> (Linnaeus, 1758)	Largehead hairtail	P	P	LC
	Carangiformes					
45	Carangidae	<i>Alectis indica</i> (Rüppell, 1830)	Indian threadfish	A	P	LC
46		<i>Carangoides malabaricus</i> (Bloch & Schneider, 1801)	Malabar trevally	A	P	LC
47		<i>Carangoides chrysophrys</i> (Cuvier, 1833)	Longnose trevally	P	P	LC
48		<i>Caranx ignobilis</i> (Forsskål, 1775)	Giant trevally	P	P	LC
49		<i>Caranx sexfasciatus</i> (Quoy & Gaimard, 1825)	Bigeye trevally	P	P	LC
50		<i>Decapterus russelli</i> (Rüppell, 1830)	Indian scad	P	P	LC
51		<i>Megalaspis cordyla</i> (Linnaeus, 1758)	Torpedo scad	P	P	LC
52		<i>Parastromateus niger</i> (Bloch, 1795)	Black pomfret	P	A	LC
53		<i>Trachinotus bailloni</i> (Lacepède, 1801)	Small spotted dart	A	P	LC
54		<i>Trachinotus blochii</i> (Lacepède, 1801)	Snubnose pompano	P	P	LC
55	Rachycentridae	<i>Rachycentron canadum</i> (Linnaeus, 1766)	Cobia	P	P	LC
	Cichliformes					
56	Cichlidae	<i>Oreochromis mossambicus</i> (Peters, 1852)	Mozambique tilapia	P	P	VU
	Acanthuriformes					
57	Drepaneidae	<i>Drepane punctata</i> (Linnaeus, 1758)	Spotted sicklefish	P	P	LC
58	Ephippidae	<i>Ephippus orbis</i> (Bloch, 1787)	Orbfish	P	P	LC
59	Leiognathidae	<i>Deveximentum indicium</i> (Monkolprasit, 1973)	Ponyfish	P	A	NE
60	Siganidae	<i>Siganus canaliculatus</i> (Park, 1797)	White-spotted spinefoot	P	P	LC
	Eupercaria					
61	Gerreidae	<i>Gerres oyena</i> (Fabricius, 1775)	Common Silver-bidy	A	P	LC
62	Haemulidae	<i>Diagramma pictum</i> (Thunberg, 1792)	Painted sweetlips	A	P	NT
63		<i>Pomadasys guoraca</i> (Cuvier, 1829)	Silver-grunt	A	P	LC
64		<i>Pomadasys maculatus</i> (Bloch, 1793)	Saddle grunt	P	P	LC
65	Lethrinidae	<i>Lethrinus microdon</i> (Valenciennes, 1830)	Smalltooth emperor	P	A	LC
66	Nemipteridae	<i>Nemipterus japonicus</i> (Bloch, 1791)	Japanese threadfin	P	P	LC
67	Priacanthidae	<i>Priacanthus hamrur</i> (Fabricius, 1775)	Moontail bullseye	P	P	LC
68	Sciaenidae	<i>Johnius borneensis</i> (Bleeker, 1851)	Sharpnose hammer	P	A	LC
69		<i>Johnius dussumieri</i> (Cuvier, 1830)	Sin croaker	A	P	LC
70		<i>Otolithes ruber</i> (Bloch & Schneider, 1801)	Tigertooth croaker	A	P	LC
71		<i>Panna microdon</i> (Bleeker, 1849)	Panna croaker	A	P	LC
72		<i>Paranibea semiluctuosa</i> (Cuvier, 1830)	Half-mourning croaker	A	P	LC
73		<i>Protonibea diacanthus</i> (Lacepède, 1802)	Blackspotted croaker	A	P	NT
74	Sillaginidae	<i>Sillago sihama</i> (Fabricius, 1775)	Silver sillago	P	P	LC
75	Sparidae	<i>Acanthopagrus berda</i> (Fabricius, 1775)	Gold silk seabream	P	P	LC
76		<i>Acanthopagrus arabicus</i> (Iwatsuki, 2013)	Arabian yellowfin	P	P	LC
77		<i>Argyrops spinifer</i> (Forsskål, 1775)	King soldier bream	P	P	LC
78		<i>Diplodus kotschy</i> (Steindachner, 1876)	One spot seabream	P	P	NE
	Carangaria					
79	Lactariidae	<i>Lactarius lactarius</i> (Bloch & Schneider, 1801)	False trevally	P	A	DD
80	Menidae	<i>Mene maculata</i> (Bloch & Schneider, 1801)	Moonfish	P	P	NE
81	Polynemidae	<i>Eleutheronema tetradactylum</i> (Shaw 1804)	Fourfinger threadfin	P	P	EN
82		<i>Polydactylus mullani</i> (Hora, 1926)	Arabian blackspot	P	P	NE
83	Sphyraenidae	<i>Sphyraena jello</i> (Cuvier, 1829)	Pickhandle barracuda	P	A	LC
84		<i>Sphyraena obtusata</i> (Cuvier, 1829)	Obtuse barracuda	P	A	LC
85		<i>Sphyraena putnamae</i> (Jordan & Seale, 1905)	Sawtooth barracuda	A	P	LC
	Mulliformes					
86	Mullidae	<i>Upeneus sulphureus</i> (Cuvier, 1829)	Sulphur goatfish	P	A	LC
	Centrarchiformes					
87	Terapontidae	<i>Pelates quadrilineatus</i> (Bloch, 1790)	Fourlined terapon	P	P	LC
88		<i>Terapon jarbua</i> (Fabricius, 1775)	Jarbua terapon	P	P	LC

Table 1. Continued.

	Pleuronectiformes					
89	Cynoglossidae	<i>Cynoglossus macrostomus</i> (Norman, 1928)	Malabar tonguesole	P	A	VU
90		<i>Cynoglossus lingua</i> (Norman, 1928)	Long tonguesole	P	A	LC
91	Paralichthyidae	<i>Pseudorhombus arsius</i> (Hamilton, 1822)	Large tooth flounder	P	P	LC
92		<i>Pseudorhombus elevatus</i> (Ogilby, 1912)	Deep flounder	P	A	LC
93	Psettodidae	<i>Psettodes erumei</i> (Bloch & Schneider, 1801)	Indian halibut	P	P	DD
94	Soleidae	<i>Brachirus orientalis</i> (Bloch & Schneider, 1801)	Oriental sole	A	P	LC
	Tetraodontiformes					
95	Tetraodontidae	<i>Lagocephalus lunaris</i> (Bloch & Schneider, 1801)	Lunartail puffer	A	P	LC
96		<i>Takifugu oblongus</i> (Bloch, 1786)	Lattice blaasop	A	P	LC

NE, not evaluated; DD, data deficient; LC, least concern; NT, near threatened; VU, vulnerable; EN, endangered; CR, critically endangered. P, Present; A, Absent

The dominant orders in terms of the number of species along with percentage composition are shown in Figure 2.

The order Eupercaria is most abundant with 18 species, and 8 families followed by Carangiformes (11 species, 2 families), Perciformes (10, 3), Scombriformes (9, 4), Clupeiformes (8, 4), Carangaria (7, 4), Pleuronectiformes (6, 4), Acanthuriformes (4, 4), Siluriformes (4, 1), Beloniformes (3, 2), Mugiliformes (3, 1), Aulopiformes (2, 1), Tetraodontiformes (2, 1), Centrarchiformes (2, 1), Torpediniformes, (2, 1), Carcharhiniformes (1, 1), Anguilliformes (1, 1), Myliobatiformes (1, 1), Rhinopristiformes (1, 1), and Mulliformes (1, 1) comprising of 95.83% of total fish diversity (Fig. 2). Of 47 families, Carangidae was dominant with 10 species followed by Sciaenidae (6 species), Serranidae (6), Ariidae (4), Clupeidae (4), Scombridae (4), Sparidae (4), Mugilidae (3), Platycephalidae (3), Sphyraenidae (3), Haemulidae (3). The families Belonidae, Cynoglossidae, Engraulidea, Paralichthyidae, Polynemidae, Stromateidae, Synodontidae, Terapontidae, Tetraodontidae, and Trichiuridae represented with 2 species each. The remaining 26 families represented with 1 species each. The total number of species reported from the Jakhau sampling site was 74, of which 4 species belong to Chondrichthyes and 70 species belong to Osteichthyes. Order Eupercaria was dominant in

Jakhau with 10 species, followed by Scombriformes with 9 species, Carangiformes and Clupeiformes with 8 species. Similarly, the number of species reported from the Mandvi sampling site was 77, of which 2 species belong to Chondrichthyes and 75 species belong to Osteichthyes. Order Eupercaria was dominant in the Mandvi sampling site with 16 species, followed by Carangiformes with 10 species.

A total of 54 species were reported common from both the sampling sites. As per IUCN red list status 2021, 10 species were assessed as Not evaluated, 06 species as Data deficient, 68 species as Least concern, 05 species as near-threatened (*Scoliodon laticaudus*, *Harpadon nehereus*, *Diagramma pictum*, *Protonibea diacanthus*, *Thunnus albacares*), 04 species as Vulnerable (*Planiliza klunzingeri*, *Oreochromis mossambicus*, *Pampus argenteus*, *Cynoglossus macrostomus*), two species as endangered (*Maculabatis gerrardi*, *Eleutheronema tetradactylum*), and one species as critically endangered (*Rhynchobatus djiddensis*).

India is one of the largest fish producing nations in the World (Parmar et al. 2015). India possesses a total of 2492 marine fish species (7.4%) of total world marine fish resources reported by CMFRI (Gopalakrishnan 2017). The highest number of marine species diversity was reported from Andaman and Nicobar Island. A study reported 1,121 species from the east coast and 1,071 species from the west coast of India (Sluka 2013). A similar work reported

112 species belonging to 12 orders, 50 families and 84 genera from Sikka coast, Jamnagar, Gujarat (Katira & Kardani 2017).

A study reported a total of 94 Osteichthyes and 26 Chondrichthyes species belonging to 62 families and 18 orders from Kharakuva fish market of Veraval taluka from Gir-Somnath district of Gujarat (Joshi et al. 2018). Parmar et al. (2015) reported 41 species belonging to 27 families from five selected reefs in the Gulf of Kachchh. A study reported 885 species belonging to 150 families from the southwest Indian Ocean (Letourneur et al. 2004).

Several studies were done on fish diversity along the coasts of Tamil Nadu. A total of 93 species belonging to 42 families were reported from Parangipettai waters, Tamil Nadu (Kadharsha et al. 2018). An Individual specimen of *Deveximentum indicium* Monkolprasit, 1973 (Leiognathidae) was reported for the first time from the Gulf of Kachchh, India (Sidat et al. 2021). Very few information regarding the distribution of this species is available.

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مقاله پژوهشی

تنوع گونه‌ای ماهیان خلیج کابچه، گوجارات، هند مطالعه موردی: سواحل جاکائو و ماندوی

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چکیده: فهرست ماهیان دریایی از دسامبر ۲۰۱۳ تا مارس ۲۰۱۵ در مناطق سواحل جاکائو و ماندوی، خلیج کابچه، ساحل غربی گاجرات، هند، از طریق جوامع ماهی‌ها تهیه شده است. در این بررسی، در مجموع ۲۰ راسته، ۴۷ خانواده و ۹۶ گونه ثبت شد. از این تعداد چهار گونه از رده ماهیان غضروفی غول‌پیکر (الاسموبرانش‌ها) و ۹۲ گونه از رده شعاع‌بالگان گزارش شد. خانواده گیش ماهیان با ۱۰ گونه بیشترین تعداد را از نظر غالبیتشان داد در حالی که راسته سوف‌ماهی‌شکلان با تعداد ۱۸ گونه بیشترین غالبیت را داشتند این چک‌لیست شامل ۱۰ گونه بررسی نشده، ۶ گونه با اطلاعات کم، ۶۸ گونه با نگرانی کم، ۵ گونه نزدیک به تهدید، ۴ آسیب‌پذیر، ۲ در معرض خطر انقراض و ۱ گونه در معرض خطر جدی در فهرست IUCN قرار دارند. از مجموع ۹۶ گونه، از محل نمونه‌برداری جاکائو ۷۴ گونه گزارش شده است. و از منطقه ماندوی ۷۷ گونه گزارش شد، در حالی که ۵۴ گونه از هر دو منطقه نمونه‌برداری مشترک گزارش شده است. گونه *Deveximentum indicium* (Monkolprasit, 1973) برای اولین بار از ایستگاه نمونه‌برداری جاکائو در خلیج کابچه، گاجرات گزارش شد. برای درک بهتر و حفاظت از چنین گونه‌هایی، مطالعات بیشتری لازم است. مطالعه دقیق زیستگاه‌های ماهیان در خلیج کابچه اطلاعات از تنوع و مواجهه جوامع ماهیان با تخریب زیستگاه فراهم می‌کند.

کلمات کلیدی: فون ماهیان، تنوع گونه‌ای، خلیج کابچه، هند.