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Ichthyofaunal Biodiversity of *Kharakuva* Fish Market, Veraval, Gujarat, India

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Abstract

The coastline of Gujarat is 1,600 km long and salt marshes, sand-belts and gravel patches mark the topography. During the present study, total 94 finfish and 26 shellfish species belonging to 62 families and 18 orders were identified fromthe *Kharakuva* Fish market of Veraval Taluka from Gir-Somanth district of Gujarat, India. Data were collected with the help of local skilled fishermen and fish farmers from different locations of the different area forAugust, 2017 to March, 2018 on the ichthyofaunal diversity of Veraval coast, Gujarat. Identification of fishes was based on fresh or preserved specimens. They were identified by using standard taxonomic keys. The collected fish were identified up to species level. During the present study there were 94 finfish species under 14 order and 52 families, whereas 26 shellfish species belonging to 4 orders and 10 families were reported. Among the finfishes order Perciformes while in case of shellfishes order Decapoda represents abundance in landing. In case of family wise contribution Carangidae contributes a greater number of finfish species and family Penaeidae contributes a greater number of shellfish species. The price structure reported that shellfish fetches good value than that of finfish. Among finfish *Protonibea diacanthus* (Jew fish) and among the shellfish lobsters *viz*., *Penulirus homarus* and *P. ornatus* (Spiny lobster) fetches the highest price.

Keywords: Ichthyofaunal, fish diversity, *kharakuva* fish market, veraval

1. Introduction

Biodiversity is the variation in the genetics and life forms of populations, species, communities and ecosystem. It affects the capacity of living system to respond to changes in the environment and is essential for providing goods and services from ecosystems (Rahbek and Colwell, 2011). The protection and conservation of biodiversity is important for the sustainability of marine natural resources. The studies were evidence that the fisheries which were exploit multi-species diversity reports the stable catches with less harm to the marine resources than that of the single targeted species fisheries (Dulvy et al., 2000; Hilborn et al., 2003).

Ichthyofaunal diversity refers to variety of fish species. India is one of the 17 mega biodiversity countries of the world, with only 2.5% of the land area, India accounts for 7.8% of the recorded species of the world (Venkataraman, 2006). The variety of fishes includes the variation among the genotype and so species diversity within species population (Johnson et al., 2016). The marine fishes were varies in their size from smallest Goby fish (up to 8 mm) to that of *Rhincodon typus*, Whale Shark (may be reach up to 12 m). The greater diversity was observed in the sea than that of land, so the exploitation rate was also more for sea resources (Geoffrey et al., 2007). For time immoral fishes were used by the human beings for the various purposes. The major utilization of fishes is as food resource. The large population throughout the world is affected by hunger and malnutrition, for them fish will be one of the good resource to fulfill their demand. Presently fish resource becomes as the major protein provider to the world's population, reports were also stated that, the developing countries were more depends on fish as source of food (Bene et al., 2007). Apart from food, marine fisheries also contribute for sport and ornamental business, which explains marine fish resource was always extremely valuable economically. In the recent past commercialization was increased very rapidly and that impacted as over exploitation of certain species to fulfillment of social and economic needs of fisher's population (Walters and Pearse, 1996). During last five-six decades due to large scale harvesting of some valuable and important fish species, resources goes on the verge of extinction. So for sustainable future of marine resources it is need to application of better policies and management strategies supported by good scientific knowledge (Kabat et al., 2012).

Throughout the world as per the Fishbase website report there were about 28,900 living species of fish have been recorded (Levque et al., 2008). While,further William et al. (2010) reported there were total of 31,362 distinct fish species available globally. According to the IUCN (2008) there were about 2,544 species of fishes reported as threatened fishes on earth *i.e.* Red list species. The earlier report along Indian waters by Talwar (1991) stated that, there were a total of 2,546 fish species were recorded from Indian waters, under 254 families and 40 orders. Further Kar et al. (2003) stated there werea total 2,500 species of fishes recorded in India, amongst them 930 live in freshwater and 1,570 are marine. Another report in 2011 specified in India, total 2,358 number of finfishes were recorded and among them 877 species are fresh water, while 113 species are brackish water and 2,358 are marine species (Ayyappan et al., 2011).

The present study location is situated in Gujarat state of India. The coastline of Gujarat is 1,600 km long,with salt marshes, sand-belts and gravel patches mark the topography. Marine ecosystems are extraordinarily diverse in all aspects; it varied from genetic to taxonomic to ecological level. About 75% of the marine fish in Gujarat are landed at 10 major centres. Veraval is the most important one, with landings of over 0.17 mt, which is 27% of the total landings of the state (CMFRI, 2017). Other major centers include Porbandar, Mangrol, Jafrabad and Okha. Most of the fresh fishes are available at the *Kharakuva*, *Divadandi* jetty, *Jaleshwar* landing centers and other most of local fresh market.In Veraval, fish comes from all nearby small and big harbors and landing centers due to the demand of processing plant and export companies. That causes the market price of fish is also high. The Veraval *Kharakuva* fresh fish market have total 190-200 shops and the number of fish merchant (*Bepari*) is around 220-230. Amongst them 200 fish merchants were having the license. In the *Kharakuva* fresh fish market chilled fish were supply in the domestic market, it means to all over India. The aim of this study was to investigate the current ichthyofaunal diversity and provide the first systemic account of fishes reported along the Veraval coast, Gujarat.

2. Materials and Methods

2.1. Data collection

The present survey study was conducted along the coastal waters of Veraval (21° 35’ N, 69° 36’ E), India which is situated along the western coast of Gujarat, India. The data was collected with the help of local fishermen landings and by visiting the *Kharakuva* fish market, which is located in Veraval Taluka of Gir-Somnath district from Gujarat state of India. Samplings was done at fortnightly intervals. Sampling was carried out during the period from August, 2017 to March, 2018. Samples were collected from different fishing gears *viz*., gill net, hook and line, trawl net, purse seine from different mesh size. The collected fishes were initially treated with 8% formalin for 48 hours during identification and finally preserved in 5% formalin for long term storage.

2.2. Identification of fishes

Identification of fishes was based on fresh or preserved specimens. They were identified by using standard taxonomic keys *viz*. Day (1878), Talwar and Jhingran (1991), Anonymous (2018; a,b,c). The collected fish were identified up to species level.

3. Results and Discussion

As per the Central Marine Fisheries Research Institute report Gujarat is top fish producing state in the India, this highest landing rank was maintained by Gujarat since from last 4 years constantly (CMFRI, 2017). They reported that in the year of 2016 landings of Gujarat state was 0.77 mt, which contributed around 21.32% to the total fish landings of India. While in the Gujarat state the Gir-Somnath district contributes maximum landings i.e. 0.34 lakh tones and approx. 44% to total Gujarat landings and from this district the present study area i.e. Veraval coast stood first in the landings. As the human population is ever increasing, it means that less fish will be available per caputevery year. The handling, processing, and marketing of fish products are essential complementary functions of all food production systems. The marketability of fish products is an important constraint in the development of fisheries. Moreover, processing and marketing activities provide the greatest opportunities for employment within the fisheries industry.During the present study, there were total 94 finfish and 26 shellfish species belonging to 62 families and 18 orders were identified fromthe *Kharakuva* Fish market of Veraval Taluka from Gir-Somanth district of Gujarat (Table 1 and Table 2).

There were total 52 families of finfish species were reported during the present study. Amongst them Carangidae contributes a greater number of finfish species (9 spp.), which was followed by Scombridae (7 spp.), Sciaenidae (6 spp.), Synodontidae (5 spp.), Clupeidae (4 spp.), Polynemidae, Carcharhinidae, Myliobatidae, Ariidae (3 spp. each), Stromateidae, Istiophoridae, Serranidae, Haemulidae, Sphyraenidae, Trichiuridae,Muraenesocidae,Hemiramphidae (2 spp. each) and remaining 35 families reported one species each of observed fin fish diversity (Figure 1).

The order wise observations of finfish representPerciformes was the most abundant with 54.26%, which was further followed by Clupeiformes (8.51%), Carcharhiniformes (5.32%), Aulopiformes (5.32%), Pleuronectiformes (4.26%), Myliobatiformes (4.26%), Beloniformes (4.26%) and Tetraodontiformes (3.19%; Figure 2). The *Kharakuva*local fish market price study stated that the fish price varies between ₹ 20-1,500/-. The highest price fetched fishes in the market were Jew fish (*Ghol*), Silver pomfret, Chinese pomfret, Indian scad, Chinese herring, Silver conger eel, Sharks, Ribbon fishes etc. (Table 1; Figure 5). The highly valued fishes mostly consumed fresh and remaining catch goes to the processing

Table 1: Finfish diversity of *Kharakuva* fish market (Gujarat)

Order	Family	Scientific name	Trade name	Local name	Price (₹ kg^{-1})
Perciformes	Stromateidae	*Pampus argenteus*	Silver pomfret	Paplet, Vichudo	500-1000
		P. chinensis	Chinese pomfret	Gadiyo, Kafari	500-1000
	Carangidae	*Formio niger*	Black pomfret	Halvo, Ardiyo	300-320
		Megalaspis cordyla	Horse mackerel	Bangda	80-90
		Atropus atropus	Kuwesh travelly	Nariyela	150-160
		Caranx sexfasciatus	Dusky travelly	Nariyela	150-160
		Decapterus russelli	Russell's scad	Khota bangda	50-60
		Carangoides malabaricus	Malabar travelly	Khadva	120-140
		C. coeruleopinnatus	Coastal travelly	Khadva	130-140
		Decapterus macrosoma	Shortfin scad	Dolly	30-35
		Elagatis bipinnulata	Rainbow runner	Maru / Popat	60-70
	Scombridae	*Rastrelliger kanagurtra*	Indian mackerel	Malbari bangda	85-90
		Euthynnus affinis	Little tuna	Gedra	70-80
		Auxis thasard	Frigate tuna	Gedri	50-60
		Katsuwonus pelamis	Skipjack tuna	Gedra/ Potla	70-80
		Thunnus albacarus	Yellow fin tuna	Vir gedra	110-120
		T. toggol	Long tail tuna	Serva	140-150
		T. obesus	Big eye tuna	Serva	140-150
	Polynemidae	*Polynemus tetradactylus*	Four finger thread fin	Dara / Bava	300-350
		P. indicus	Indian thread fin	Ravas	300-350
		P. heptadactylus	Seven finger thread fin	Sheri	250-280
	Sciaenidae	*Johnius dussumieri*	Bearded croaker	Mathara dhoma	55-60
		Otolithes cuvieri	Lesser tooth croaker	Silver dhoma	65-70
		O. ruber	Tiger tooth croaker	Mosambi dhoma/ TT dhoma	130-140
		O. biauritus	Bronze croaker	Goyni/Koth	300-350
		Nibea maculate	Blotched croaker	Babar	70-75
		Protonibea diacanthus	Jew fish	Ghol	900-1500
	Istiophoridae	*Istiophorus platypterus*	Sail fish	Ghodo	95-100
		Makaira indica	Black marlin	Ghodo	85-90
	Serranidae	*Epinephelus diacanthus*	Six barred reef cod	Lal vekhlu	180-200
		E. tauvina	Grey reefcod	Vekhlu	240-270
	Haemulidae	*Pomadasys argenteus*	Silver grunt	Ghurko	170-180
		Diagramma pictum	Painted sweet lip	Aandar	160-170
	Xiphiidae	*Xiphias gladius*	Sword fish	Surajmukhi	80-90
	Sphyraenidae	*Sphyraena obtusata*	Obtuse barrakuda	Jeera	90-100
		S. jello	Gaint sea pike, barrakuda	Jeero , Kunga	100-110
	Lethrinidae	*Lethrinus ornatus*	Ornate emperor bream	Dhamil	220-250
	Lactariidae	*Lactarius lactarius*	White fish	Khitli	130-140

Continue...

Order	Family	Scientific name	Trade name	Local name	Price (₹ kg^{-1})
Perciformes	Rachycentridae	*Rachycetron canadum*	Cobia	Sakro	270-300
	Menidae	*Mene maculata*	Moon fish	Chand fish	25-30
	Coryphaenidae	*Coryphaena hippurus*	Dolphin fish	Apnus	150-170
	Echeneidae	*Remora remora*	Sucker fish	Meghar	20-25
	Terapontidae	*Terapon jarbua*	Jarbua terapon	Khaturo / Hajam	25-30
	Gerreidae	*Gerres filamentosus*	Whipfin majorra	Todyu	70-80
	Lutjanidae	*Lutjanus johni*	Golden snapper	Raja, Gulaliyo	240-250
	Nemipteridae	*Nemipterus japonicas*	Thread fin breams	Rani fish / Lal machla	80-90
	Priacanthidae	*Priacanthus hamrur*	Bull's eye	Dola, Dorara	30-50
	Mullidae	*Upeneus sulphureus*	Yellow goat fish	Khota lal machla	30-40
	Drepaneidae	*Drepane punctala*	Spotted sickle fish	Dafniyo	80-100
	Trichiuridae	*Lepturacanthus savala*	Silver ribbon fish	Bagga, Silver bagga	170-180
		Trichiurus lepturus	Grey head hair tail	Bagga, Black bagga	150-170
Carcharhini-formes	Carcharhinidae	*Carcharias melnopteruts*	Black shark	Patari	160-170
		C. limbatus	Black tip shark	Magra	100-130
		Scoliodon laticaudus	Spadenose shark	Sandho	80-90
	Sphyrnidae	*Sphyrna lewini*	Hammer head shark	Nathiyo	110-120
	Triakidae	*Mustelus mosis*	Arabian smooth hound	Bokha	70-80
Aulopi-formes	Synodontidae	*Saurida tumbil*	Grater lizard fish	Bhungar / Chor bumla	35-40
		S. undosquami	Brush tooth lizard fish	Bhungar / Chor bumla	30-35
		Saurida longimanus	Long fin lizard fish	Pencil bhungar	35-40
		Trachinocephalus myops	Bluntnose lizard fish	Patta	25-30
		Harpodon nehereus	Bombay duck	Bumbla / Danntaniya	30-40
Pleuronecti-formes	Paralichthyidae	*Pseudorhombus arsius*	Large toothed flounder	Khetar, Datari	60-80
	Psettodidae	*Psettodes erumei*	Indian halibut	Hariyo	100-110
	Cynoglossidae	*Cynoglossus lingua*	Long tongue sole	Moti jibh	75-80
	Soleidae	*Zebrias quagga*	Zebra sole	Jibh	30-40
Myliobati-formes	Myliobatidae	*Mobula diabolus*	Devil ray	Timri	80-90
		Rhinoptera javanica	Cow ray	Bur	100-105
		Aetomylaeus nichofii	Neiuhof's eagle ray	Karaj	60-70
	Dasyatidae	*Dasyatis zugei*	Pale – edged sting ray	Varara	90-100
Clupe-iformes	Clupeidae	*Tenualosa ilisha*	Indian scad	Chaksi	800-900
		T. toil	Chinese herring	Palvi, Palvo	500-600
		Sardinella longiceps	Oil sardine	Aed	30-40
		Opisthopterus tardoore	Tardoore	Khoti katti	25-30
	Dussumieriidae	*Dussumeria acuta*	Rainbow sardine	Telas katti	20-25
	Engraulidae	*Colia dussumieri*	Golden anchovy	Mendli	10-15
	Chirocentridae	*Chirocentrus dorab*	Silver bar	Dai	80-100
	Pristigasteridae	*Ilisha megaloptera*	Big eye ilisha	Katti, Dorari katti	30-35

Continue...

Order	Family	Scientific Name	Trade name	Local name	Price (₹ kg^{-1})
Rajiformes	Rhynchobatidae	*Rhynchobatus djiddensis*	Guitar fish, white spotted shovel nose ray	Ghose, Bhuttar	150-200
	Rhinobatidae	*Rhynobatos granulatus*	Granulated shovel-nose ray	Ghose, Bhuttar	150-200
Anguilliformes	Muraenesocidae	*Congresox talabonoides*	Indian pike conger	Vaam	230-250
		Muraenesox cinereus	Silver conger eel	Vaam	500-550
Siluriformes	Ariidae	*Arius thalassinus*	Giant catfish	Khago, Khagi	150-160
		A. dussumieri	Dussumieri's catfish	Khago, Khagi	60-70
		Osteogeniosus militarius	Soldier catfish	Goji khagi	200-250
Beloniformes	Exocoetidae	*Cypselurus oligolepis*	Large scaled flying fish	Pankhiya jira	50-60
	Hemiramphidae	*Hemiramphus far*	Black barred half beak	Chanchiya jira, kunga	40-50
		H. lukei	Lutke's half beak	Tori	70-75
	Belonidae	*Strongylura stongylura*	Full beak gar fish	Chanchiya jira	75-80
Pristiformes	Pristidae	*Pristis microdon*	Small toothed saw fish	Churiyu, Surya magru	45-50
Scorpaeniformes	Platycephalidae	*Platycephalus indicus*	Indian flathead	Gokhin	20-25
Mugiliformes	Mugilidae	*Mugil cephalus*	Grey mullet	Boy, Gandhiyo	50-60
Tetraodontiformes	Triacanthidae	*Pseudotriacanthus strigilifer*	Long- spined tripod fish	Helicopter	15-20
	Monacanthidae	*Aluterus monoceros*	Unicorn letherjacket	Don	110-120
	Balistidae	*Abalistes stellaris*	Starry triggerfish	Gagira	25-30

1 US$=INR 64.47 (avg. of August 2017 to March 2018)

plants, from where after value addition and freezing those were exported to the other countries.

Among the 26 species of shellfish there were total 10 families and 4 orders were observed. The order Decapoda was most abundant comprising with total 20 species (76.92%) of crustaceans (Figure 3 and 4). Among the order Decapoda, family Penaeidae consist of 8 species which was followed by Palinuridae, Portunidae, Sepiidae by contributing each of 4 shellfish species (Table 2). The comparison between the *Kharakuva* market price structures it was observed that crustaceans shows higher market value than that of finfishes. This is mainly because of their feeding preference, taste and higher demand among the consumer population. The lobsters fetch the higher amount than that of shrimps and cephalopod species among shellfishes. Crabs and non-penaeid shrimps were mostly preferred by local fish consumers (Figure 6).

The fisheries of any natural ecosystem was based relatively on large number of species and a wide range of fishing gears. Habitat degradation, invasion of exotic fishes and fishing pressure are the main causes for loss of fish biodiversity. Study reports from Central Marine Fisheries Research Institutedescribedthat, India contributes of about 2,492 marine fishes (7.4%) of the total world marine fish resources. While from the total reported fish diversity from India, the marine fishes constitute of 76% (2,492 spp.) which belonging to 941 ordersand 240 families. Study also reported that Andaman and Nicobar archipelago water represents the highest number of species diversity *i.e.* 1,431species, which was followed by the east coast of India with 1,121 species and the west coast with 1,071species (Joshi et al., 2017).

Some of the local studies reported as follows; from Karaikal waters, southeast coast of India there were total 195 species belonging to 18 orders, 87 families and 134 genera which includes *Stolephorus indicus, Thryssa malabarica*, *T.purava, Chirocentrus dorab, Arius arius*, *Plotosus canius*, *Mugil cephalus*, *Hemiramphus far,Platycephalus indicus, Epinephelus tauvina*, *E. malabarica, Sillago sihama, Caranx sem*, *Scomberoidestol*, *Lutjanus fulviflamma*, *Gerres abbreviatus*, *Upeneus sulphureus*, *Drepane punctata*, *Terapon puta*, *Trichiurus lepturus*, *Pampus argenteus*, *P. chinensis*,

Table 2: Shellfish diversity of *Kharakuva* fish market (Gujarat)

Order	Family	Scientific Name	Trade name	Local name	Price (₹ kg^{-1})
Decapoda	Solencoceridae	*Solenocera crassicornis*	Coastal mud prawn	Lal kolmi, Goiner	70-80
	Penaeidae	*Parapenaeopsis stylifera*	Kiddi prawn	Tiny kolmi	110-120
		Metapenaeus affinis	Indian prawn	Medium	250-300
		Metapenaeus kutchensis	Kutch prawn	Surajbari, Katchi jinga	150-200
		Metapenaeus Monoceros	Speckled prawn	Kapsi	280-300
		Penaeus indicus	Indian white prawn	White, Jumbo	380-400
		Penaeus monodon	Tiger prawn	Tiger	600-700
		Penaeus semisulcatus	Flower prawn	Flower	650-700
	Hippolytidae	*Parapenaeopsis sculptilis*	Rainbow prawn	Patta	100-120
		Exhippolysmata ensirostris	Hunter shrimp	Dodi	80-90
	Sergestidae	*Acetes indicus*	Paste shrimp	Javlo	8-10
	Palinuridae	*Penulirus polyphagus*	Rock lobster	Titan	800-1000
		Penulirus homarus	Spiny lobster	Titan	900-1000
		Penulirus ornatus	Spiny lobster	Titan	900-1000
		Thenus orientalis	Sand lobster	Kako	280-300
	Scyllaridae	*Sepia pharaonis*	Cuttle fish	Makul	230-250
	Portunidae	*Charybdis cruciata*	Cross crab	Lal karchlo	70-80
		Scylla serrata	Mud crab	Dhebro karchlo	50-60
		Portunus pelagicus	Blue crab	Blue karchlo	70-80
		Portunus sanguinolentus	Three spotted crab	Tapkavaro karchlo	80-90
Sepiida	Sepiidae	*Sepia aculeata*	Needle cuttlefish	Dedka	200-300
		Sepia prasadi	Cuttle fish	LB (long bone)	200-300
		Sepiella inermis	Spineless Cuttle fish	Inda goti, Goti	100-110
		Photo Loligo duvaucelli	Squid	Narsinga	150-200
Teuthida	Loliginidae	*Doryteuthis sibogae*	Needle squid	Needle	130-140
Octopoda	Octopodidae	*Octopus globosus*	Octopus	Salak, Sikavdo	70-90

1 US$=INR 64.47 (avg. of August 2017 to March 2018)

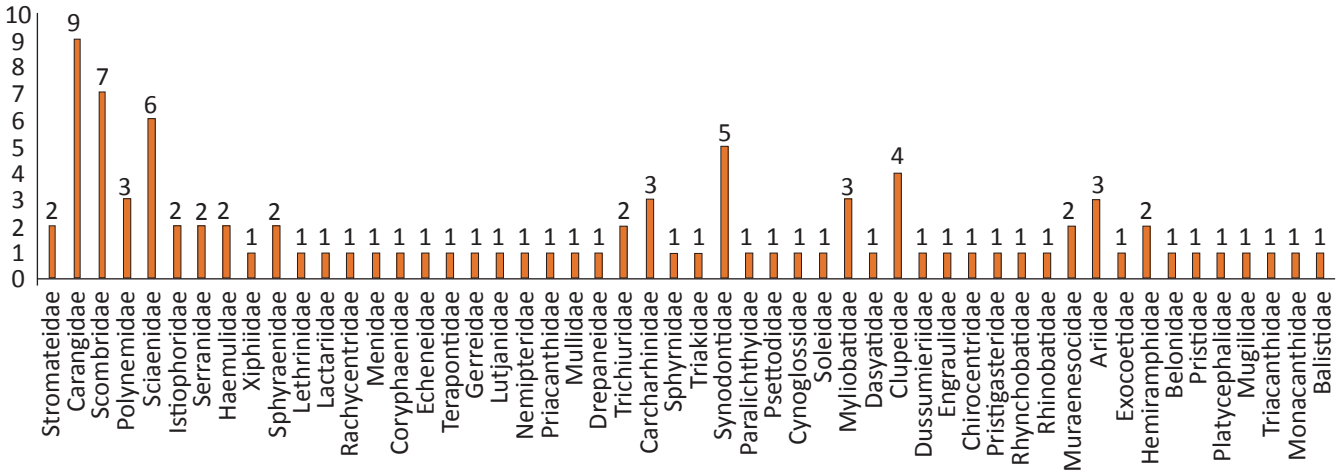

Figure 1: Diagrammatic representation of the number of species occurring in each Finfish Family

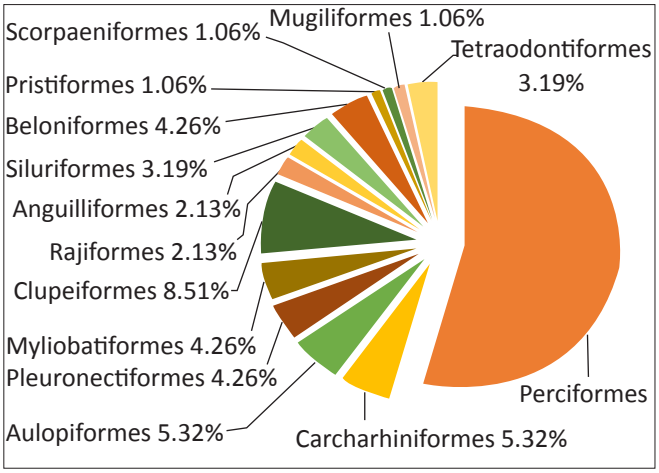

Figure 2: Diagrammatic representation of % contribution in each Finfish Order

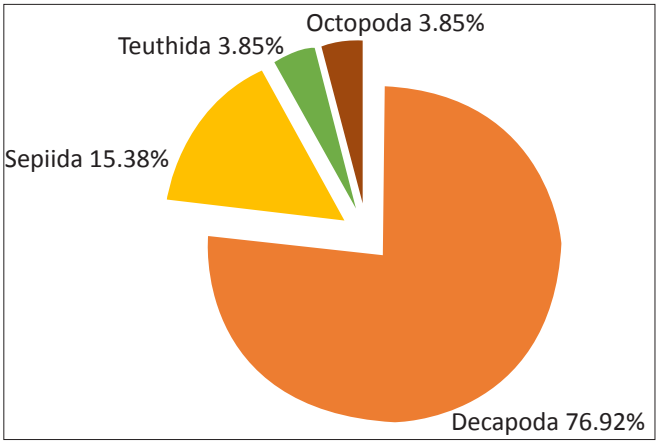

Figure 3: Order-wise distribution of Shellfish

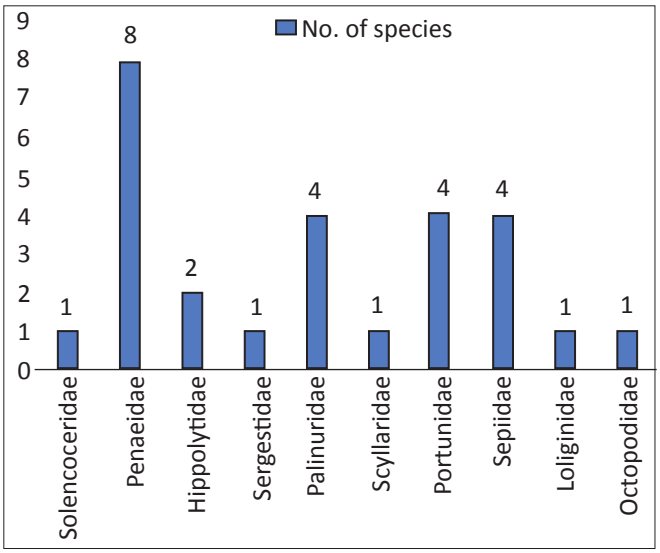

Figure 4: Family-wise distribution of Shellfish Species

Cynoglossus arel and *Triacanthus biacculeatus* were reported (Rajasegar and Sendhilkumar, 2009). The Ichthyofaunal diversity of Ponnani estuary, Kerala documented 112 species

Lepturacanthus savala

Pampus argenteus

Scomberomorus guttatus

Coryphaena hippurus

Figure 5: Finfish species available at *Kharakuva* Fish Market (Gujarat)

belonging of 14 orders, 53 families and 80 genera (Bijukumar and Sushama, 2000), whereas from Giriyampeta estuary, Yanam (U.T. of Puducherry) 36 species were identified with 13 families which includes 30 species, the order Clupeiformes reported a greater number of fishes (Kumaran et al., 2012).

Metapenaeus affinis

Panulirus homarus

Portunus sanguinolentus

Figure 6: Shellfish species available at *Kharakuva* Fish market (Gujarat)

The ichthyofaunal diversity of Digha coast, West Bengal contributed 238 species from 72 families (Goswami, 1992), another study from similar region reported 212 species from 145 genera and 88 families (Chatterjee et al., 2000), further the most recent study from similar coast reported 322 fish species under 103 families (Yennawar et al., 2015). The study along the Bahuda estury, Orissa reported that there were 25 species under 6 orders and 18 families (Behera et al., 2013) were identified. Study also revealed that *Rastrelliger kanagurta* was dominant among the species (13.01%), while order wise Clupiformes (30.08%) was dominant which was followed by Mugiliformes, Tetradontiformes, Perciformes, Siluriformes and Cypridontiformes.

The ichthyofaunal diversity from two creeks of Port Blair was recorded a total of 1,701 individuals constituting 8 orders, 30 families and 42 genera (Arun Kumar et al., 2016). The study along the Great Nicobar Island from Bay of Bengal was reported a total of 258 species of fin fishes belonging to 141 genera, 84 families and 19 orders. Among these, order Perciformes represents 47 families, 84 genera and 169 species followed by Clupeiformes, Angulliformes, Tetrodoniformes, Cyprinodontiformes, Scorpaeniformes, Rajiformes, Elopiformes, Pleuronectiformes, Syluriformes, Laminiformes, Bercyformes, Aelopiformes, Syngathiformes and Gonorhychiformes. Study also revealed that the species which were reported are medicinally important and ornamentally valuable species (Rajaram et al., 2004). Another study from all the available habitats of the fresh water and marine environment of the Andaman and Nicobar Islands have reported 539 fish species (Rao et al., 2000).

The study from the sea and coastal waters of Gujarat, there were about 306 fish species were reported. Study also stated that the Gujarat fishery presently dominated by fishes like ribbonfishes (*Trchiurus lepturus*), Bombay duck (*Harpodon nehereus*), croakers, carangids, threadfin breams, lizardfishes, tuna (*Euthynnus affinis*, *Thunnus tonggol*, *Katsuwonus pelamis*, *Thunnus albacores* and *Sarda orientalis*), seerfish, pomfrets, catfish, flatfishes and non-penaeid prawns (Joshi et al., 2017). Another study from Gujarat waters about the ichthyofaunal diversity in the vicinity of marine protected areas, Jamnagar enumerated there were total of 109 fish species belongs to 19 orders, 58 families and 93 genera. Study also stated that Carangidae and Sciaenidae were two families recorded highest number of species diversity (8 species) which was followed by Mugilidae (5 spp.), Clupeidae (4 spp.), Haemulidae (4 spp.), Serranidae (4 spp.) and Sparidae (4 spp.; Brahmane et al., 2014). The similar study particular by considering the *Dol* net fishing was done along the Navabandar coast Gujarat (Sikotaria et al., 2018), study revealed that altogether 24 major fish and shellfish species were caught with Non-penaeid shrimps contributed 40.22% of the total landings, followed by *Harpadon nehereus* (Bombay duck; 15%). The foreign water studies reported that along the inner Gulf of Nicoya, Pacific coast of Costa Rica, Central America there were total 274 species under 72 families were reported. The study further detailed as among all these species, 127 (46.4%) were marine species and 147 (53.6%) were estuarine-associated species (Murase et al., 2014).

4. Conclusion

The present landing center (*Kharakuva*, Veraval) from Saurashtra region of Gujarat represents the region is still under controlled fishing pressure. But during observations it was also reported that juveniles fishing was also started to contributing the landings. As fishes are immense important to the ecosystems, so they have to conserve, valued and

managed properly. The study also describes the market value of the fishes, stated fish forms the economic as well as social importance to the Indian society.

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