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Ichthyofaunal Diversity of Karanja, Dharamtar Creek along Maharashtra Coast

Garima[1], Kishor Kunal[1], A T Landge[2], A K Jaiswar[2], G Deshmukhe[2*]

[1]ICAR-Directorate of Coldwater Fisheries Research, Bhimtal-263136, Nainital, Uttarakhand
[2]FRHPHM Division, Central Institute of Fisheries Education, Mumbai-400061, Maharashtra

ABSTRACT

Ichthyofaunal diversity was studied for creek situated in Raigad district of Maharashtra, one of the important district for state in terms of fisheries. In this, creek fishing is mainly done with traditional crafts and gear by Koiliwada community. Total 36 species of fishes belonging to 18 families and 8 orders were recorded of which 2 were Chondrichthyes and 34 species were Osteichthyes. Relatively more diversity in post-monsoon (29 species) seasons than pre-monsoon (20 species) was observed with in monsoon (18 species). Large numbers of juveniles were recorded which could be not identified by traditional method of taxonomy due to their small size. Abundance of fish larvae in the creek show the preference of creek as nursery ground.

Key Words: Conservation, Creek, Ichthyofaunal diversity, Traditional fishing.

INTRODUCTION

Maharashtra is coastal state of India which possess the coast line of 720km which form the significant creeks and rivers along the coast. Dharamtar creek is the estuarine complex of Amba River and Patal Ganga River in Raigad, which open in to southern limit of Mumbai harbor and plays an important role in fisheries of the state. Fishermen community of this area belong to Koliwada community and practice traditional fishing methods in the creek. Wild life Institute of India has identified Dharamtar creek as anImportant Coastal and Marine Biodiversity Area (ICMBA) of the west coast of India. On the other hand the adjacent are as of the creek have been identified for many industrial developmental works which will definitely alter the ecology of the creek. Loss of marine life diversity are largely result of conflict in gusers, in particular coastal habit at which leads to degradation of habitat. Rapid industrialization of metropolitan city Mumbai has caused environmental stress in some creek environment, which may have harmful impact in highly productive and high diversified coastal marine ecosystem (Nair *et al,* 1991) including a rich plankt on community (Tiwari and Nair, 2002). Aquatic ecosystems are affected by several health stressors which significantly deplete biodiversity at all levels. In the future, the loss of biodiversity and its effects are predicted to be greater for aquatic ecosystems than for terrestrial ecosystems (Sala *et al,* 2000). Proper assessment of status of coastal ecosystem is important to monitor or control the factors affecting them.

Fishing gears like dolnet and gillnet were common in this creek followed with other gears such as lift net, hand nets and encircling gill nets. The fishermen used small wooden crafts for catching crab inside the mangroves. Dolnet was used mainly to catch *Acetes* sp with small mesh size, which also accounts a huge catch of plastic waste along with juvenile of fishes. Selection of the gear used in this area was based on the tidal amplitude and water depth. Few gears were seasonal (encircling gill nets in pre-monsoon) according to target catch and wave condition in Arabian Sea whereas dolnets were used round the year. Therefore, the significant fishing activities in this creek with traditional crafts and gears may have a chance to impact the local ichthyofaunal diversity. Furthermore, the construction of proposed port will also cause a huge

change in the ecology of creek which may affect the diversity of fish and the people rely on them for livelihood. Henceforth, to study the impact of such changes, the present study was carried out to understand the actual status of fish in terms of quality.

Study area

Dharamtar creek was located on west coast of India. This area was having greater effect of both southwest monsoon and upwelling. In the study area huge port has been proposed and construction has been started which coincide with the station number 2. Station 1 was area where sea starts and maximum tidal influence exists. Station 3 was very close to adjacent mangrove while station 4 was in front of cargo storage. Station 5 was located in inner side of creek. The Dharamtar creek (Table 1) was fringed by dense mangrove and presence of mud flats which support rich biodiversity. Seasons here can be classified as monsoon (June-September), post-monsoon (October-January) and pre-monsoon (February-May).

Fig. 1: Selected sampling stations in Dharamtar creek

MATERIALS AND METHODS

For studying the ichthyofaunal diversity samples were collected from August 2015 to June 2016. For catching the fish boat was hired from local fishermen and fishing was done by using different gears having various mesh size. Samples were also collected from small landing center located on the near coast where the traditional boats used to land the fish after fishing in nearby waters. From the creek samples were taken to lab on the same day and preservation was done by using 8-10%formalin. Different species have been identified by using the standard identification keys and Fish Base (Froese and Pauly, 2016). Identification was done by following the traditional methods based on morphometric and meristic characteristics

RESULTS AND DISCUSSION

The study on ichthyofaunal diversity of Dharamtar creek showed 36 species of fishes, of which 2 were Chondricthyes and 34 species Osteichthyes. Different fish species belong to order 8 different orders and 18 families. Orders of fish were Perciformes (21), Clupeiformes (7), Mugiliformes (2), Tetraodondtiformes (2), Aulopiformes (1), Siluriformes (1) and Myliobatiformes (1), Carchariniformes (1). Relatively more diversity was recorded in post-monsoon season (29 species) thanpre-monsoon (22 species) with minimum in monsoon (18 species) (Table 2) which might be due to availability of abundance of food organism specially the copepod. In coastal water of Japan Sea Ogawa and Nakahara (1979) found that large number of pelagic fishes could be found in the areas where large number of copepods occurred as this

Table 1: List of stations at Karanja creek

S. No.	Station Code	Latitude	Longitude
1	Stn1	18˚50˙14.81”N	72˚57’04.29”E
2	Stn2	18˚50’54.05”N	72˚58’14.02”E
3	Stn3	18˚51’43.20”N	72˚58’44.99”E
4	Stn4	18˚52’07.6”N	72˚59’22.54”E
5	Stn5	18˚52’33.96”N	72˚59’55.24”E

Table 2: Classification and occurrence of major fishes at Dharamtar creek

	FishSpecies	Pre- monsoon	Monsoon	Post monsoon
Order	Perciformes			
Family	Gobiidae			
1.	*Boleophthalmus boddarti*	+	+	-
2.	*Trypauchen vagina*	+	+	+
3.	*Gobius striatus*	+	+	+
4.	*Parachaeturichthys polynema*	+	+	+
5.	*Istiobius ornatus*	+	+	+
Family	Carangidae			
6.	*Megalaspis cordyla*	-	+	+
7.	*Parastromateus niger*	-	-	+
8.	*Alepes kleinii*	+	+	+
9.	*A.djedaba*	+	+	+
Family	Stromateidae			
10.	*Pampus argenteus*	-	-	+
11.	*Pampus chinensis*	-	-	+
Family	Sciaenidae			
12.	*Johnius borneensis*	+	+	+
13.	*Protonibea diacanthus*	+	-	+
14.	*Otolithoides biauritus*	+	-	+
15.	*J.belangeri*	+	+	+
16.	*J.glaucus*	+	+	+
Family	Polynemidae			
17.	*Polynemus tetradactylus*	-	-	+
Family	Gerreidae			
18.	*Gerres filamentosus*	-	-	+
Family	Sillaginidae			
19.	*Sillago sihama*	-	+	+
Family	Trichiuridae			
20.	*Lepturacanthus savala*	+	+	+
Family	Terapontidae			
21.	*Terapon jarbua*	-	-	+
Order	Clupeiformes			
Family	Clupeidae			
22.	*Escualosa thoracata*	-	-	+

23.	*Sardinella longiceps*	+	+	-
24.	*Tenualosa toli*	-		+
Family	Engraulidae			
25.	*Coilia dussumieri*	+	-	+
26.	*Stolephorus indicus*	-	-	+
27.	*Thryssa vitrirostris*	-	-	+
Family	Pristigaeteridae			
28.	*Pellona* sp.	-		+
Order	Mugiliformes			
Family	Mugilidae			
29.	*Mugil cephalus*	+	+	-
30.	*Parachelon grandisquamis*	+	+	-
Order	Tetraodontiformes			
Family	Tetraodontidae			
31.	*Lagocephalus sp.*	+	-	+
32.	*Tetraodon nigroviridis*	-	+ =+	+
Order	Aulopiformes			
Family	Synodontidae			
33.	*Harpadon nehereus*	+	+	+
Order	Siluriformes			
Family	Ariidae			
34.	*Nemapteryx caelata*	+	-	-
Order	Carcharhiniformes			
Family	Carcharhinidae			
35.	*Scoliodon laticaudus*	+	-	-
Order	Myliobatiformes			
Family	Dasyatidae			
36.	*Dasyatis bleekeri*	+	-	-

(+ Present - Absent)

was their major food. Arabian Sea oceanography and fisheries of west coast of India was reported by Madhupratap *et al* (2001). They reported major pelagic fisheries in the northern part to be comprised by carnivores like Bombay duck, Horse mackerel and Ribbon fish. In the present study also these species were reported and overall also carnivorous fishes were more abundant as compared to planktivorous. Study was conducted to assess the diversity of ichthyofaunal in Muthupete stuary situated in Tamil Nadu (south east coast) was done by Sukumaran *et al* (2014), total 22 species were recorded which but they found high species diversity in pre- monsoon which contradict the present finding as diversity was more in post monsoon. Most dominant family was Gobiidae and Sciaenidae followed by Carangidae (Fig.2). Few commercially important species like Pomfret (*Parastromateus niger, Pampus argenteus*and *P.chinensis*) and Sardine (*Sardinella longiceps)* are found here. Croakers (*Johnius belangeri, J.glaucus, J.borneensis* and *Otolithoides biauritus, Protonibea diacanthus*) and anchovy (*Coilia dussumieri*) are most common fish in this creek while mullets (*Mugil cephalus*, *Parachelon grandisquamis*) and cat fish (*Nemapteryx caelata*) were observed only in few particular months. Mullets were more abundant in station 3 and 4. Ichthyofaunal diversity of Thane creek was studied by Goldin and Athalye (2012) and they also reported *Mugil cephalus,* as one of the dominant species among total 12 species of fish recorded from the creek. Different species of Goby (*Trypauchen vagina, Parachaeturichthys polynema, G.striatus, Istiobius ornatus*) and Mudskipper (*Boleophthalmus boddarti*) was also identified, especially in mangrove region. All the goby and mudskipper species were collected from mangrove area near station 3. Due to extensive dredging activities near station 2 fishes were very insignificant in number. A few Goby species are consumed by human and few are used in aquariums but they are comparatively less explored groups. Ichthyofaunal diversity and status with reference to physico-chemical characteristics of Sharavathi estuary was studied by Sudeep and Ganesh (2015). And they reported 32 species of fishes belonging to 9 orders and 25 families. Almost similar number was obtained from the present study. High number of fish juveniles were obtained from mangrove are a which was nearest to station 4, confirming the presence of nursery ground.

In a study in Meghna river estuary 53 fish species could be identified and it was found that the most important factors controlling the fish species distribution were water temperature and rainfall. In the creek both pelagic and demersal fishes were recorded which shows the conducive environment for fishes (Hossain *et al,* 2012). Biodiversity maintains a healthy biosphere and provides direct and indirect value to humans. There are direct and indirect economic, aesthetic, and scientific reasons for preserving biodiversity.

For the purpose of conservation, documentation of ichthyofaunal diversity is very important. Creek is surrounded by fishermen communities who operate traditional crafts and gears in creek waters. They mostly use non-motorized boats. Passive gears like castnet, dolnet and gillnetare used to catch the fish. Fishing in ecologically sensitive area like mangrove result in loss of juveniles offish (growth over fishing). Growth overfishing can affect the diversity of creek in long run. These small sized fishes do not fetch good price and get discarded. There are regulation like Marine Fishing Regulation Act for offshore waters but no systematic rules exist for coastal waters. From conservation and fisheries management point of view, fishing operation in this

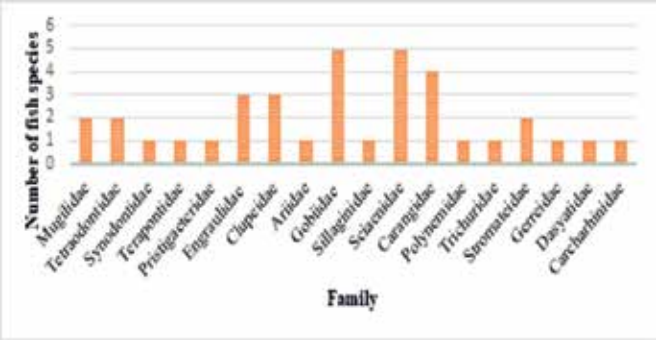

Fig.2: Occurrence of species of different family

ecologically sensitive area should bemonitored and regulated.

CONCLUSION

The present status of creek in terms of ichthyofaunal diversity reflected that the water in the creek was not polluted. Operation of port in future can make significant changes in system. Probable changes could be oil pollution, reduction in number of benthic organisms, loss of path of migratory species, increase in number of fouling organism and effect on fish in gactivities in this area. Other than this, other threats to ecosystem were habitat loss, population growth, over exploitation of natural resources, invasive species, climate change, and pollution. To maintain the production potential of creek different steps could be taken like shifting the fishing surrounding fishing grounds protect sensitive habitats from disturbances and damage from fishing gear, such as bottom trawls, prevent by catch of non-target species, growth over fishing which is catching juveniles and recruitment overfishing which was catching of broods should be avoided.

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