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Monitoring of fin-fish resources from Uran coast (Raigad), Navi Mumbai, Maharashtra, West coast of India

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Abstract

India is rich in natural resources and the annual harvestable fishery potential of the country is estimated to be 3.48 million tones. It is established that the fish biodiversity of the country is diminishing at an alarming rate in all the aquatic zones. The data on species diversity of fishes from Uran coast revealed presence of 31 species of which 3 species of Chondricthyes representing 2 genera and 2 families and 28 species of Osteicthyes representing 28 genera and 23 families were recorded. Of the recorded species, 55 % belonged to Order Perciformes, 10 % to Clupeiformes, 6 % each to Rajiformes, Mugiliformes and Anguilliformes, 3 % each to Aulopiformes, Carcharhiniformes, Pleuronectiformes, Siluriformes and Tetraodontiformes. Among the recorded species, ribbon fishes/spiny hair tail (*Lepturacanthus savala*), croakers (*Johnius soldado*), dhoma (*Sciaena dussumierii*) and gold spotted grenadier anchovy (*Coilia dussumierii*) are abundant where as Bleeker's whipray (*Himantura bleekeri*), Sharp nose stingray (*H. gerrardi*) and Spotted Green Puffer fish (*Tetraodon nigroviridis*) were rare. Stripped mullet (*Mugil cephalus*), cat fish (*Mystus seenghala*), three stripped tiger fish (*Terapon jarbua*) and mudskippers (*Boleophthalmus boddarti*) were very common. At present, the yield of fin-fish resources from Uran coast is optimum; it is decreasing day by day due to coastal pollution affecting the status of the local fishermen because of which they are looking for other jobs for their livelihood.

Keywords: Fin-fish Resources, Species diversity, JNPT, Uran, Navi Mumbai

INTRODUCTION

Knowledge on species diversity of an ecosystem would help maximizing resource utilization in a sustainable manner besides preserving biodiversity [1]. The world's fisheries-on which about a billion people, mainly in developing countries, depend for their primary source of protein – are in crisis. Many are now in decline, many more may follow. The effects on the environment, and on economics and societies, are probably causing more concern than those of any other offshore activity [2]. Catching fish faster than they can reproduce reduces stocks, and thus causes the harvest of the seas to falter and then fall. The decline has reached serious proportions in many coastal waters due to inshore areas with dense populations, a high demand for fish and little employment which has affected many fisheries on the high seas [3].

India is rich in natural resources and the annual harvestable fishery potential of the country is estimated to be 3.48 million tons [4]. It is established that the fish biodiversity of the country is diminishing at an alarming rate in all the aquatic zones [5]. Due to various anthropogenic stresses, number of fish is showing declining trends in their catches from the conventional fishing grounds and some have become threatened too [6]. Various factors which causes imperilment of fishes have been identified as, physical habitat loss due to construction, soil erosion due to deforestation, chemical pollution due to industrial and municipal wastes, over-exploitation and indiscriminate killing of juveniles and brood fishes, competition from introduction of non-native species and spread of dreaded diseases [7, 8, 9]. Fishing alters the ecology, biological structure and dynamics of marine ecosystem [10]. The progress and the problems of marine fishery of India have been reviewed by Devraj and Vivekanandan [11].

Till now extensive scientific research on ecological aspects of marine fishes has been carried out in India, however data on species diversity of marine fishes from Uran coast, Navi Mumbai is not available. Hence, the present study on species diversity of marine fishes from Coastal Environment of Uran (Raigad), Navi Mumbai, Maharashtra, is undertaken.

MATERIALS AND METHODS

The study area

Geographically, Uran with the population of 23,251 is located along the eastern shore of Mumbai harbour opposite to Coloba. A creek called 'Uran creek / Sheva creek' (Lat. 18^0 50' 20" N and Long. 72^0 57' 5" E) encircles Uran city towards the north side and is continuous with the Panvel creek and Thane creek. Creek namely Dharamtar creek (Lat.18^0 50' 5" N and Long. 72^0 57' 10" E) encircles Uran city towards the south side and is continuous with the Karanja creek and Pen – Khopoli creek. On the west side, Uran is encircled by Arabian Sea (Fig. 1). Both creeks have rocky shore towards the seaward side where as remaining part of the creeks is marshy and of mud flats. Both Uran creek and Dharamtar creek are uniformly deep with 10 meters range and have moderate cover of mangroves with mud flats and low lying marshy areas on their sides. Although both creeks are under anthropogenic pressure, still they support major fisheries of true fin-fishes.

The coastal environment of Uran has been under considerable stress since the onset of industries like Oil and Natural Gas Commission LPG Distillation Plant, Grindwell Norton Ltd., MSEB Gas Turbine Power Station, Bharat Petroleum Corporation Ltd.,

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Jawaharlal Nehru Port Trust (JNPT), Nhava-Seva International Container Terminal (NSICT), Container Freight Stations (CFS) etc.

An international port called 'Jawaharlal Nehru Port Trust (JNPT)' was established in 1989 near the Uran creek. JNPT is one of the busiest ports among 11 Major Indian Ports and handles about 60% of the total National Marine Transport of cargos. JNPT supports a variety of maritime activities; as a result, the area of Uran creek became the ground for hectic activities of Container Freight Stations (CFS). These activities affect the ecology of fauna and flora of mangroves. Hence this area has been identified for the ecological assessment

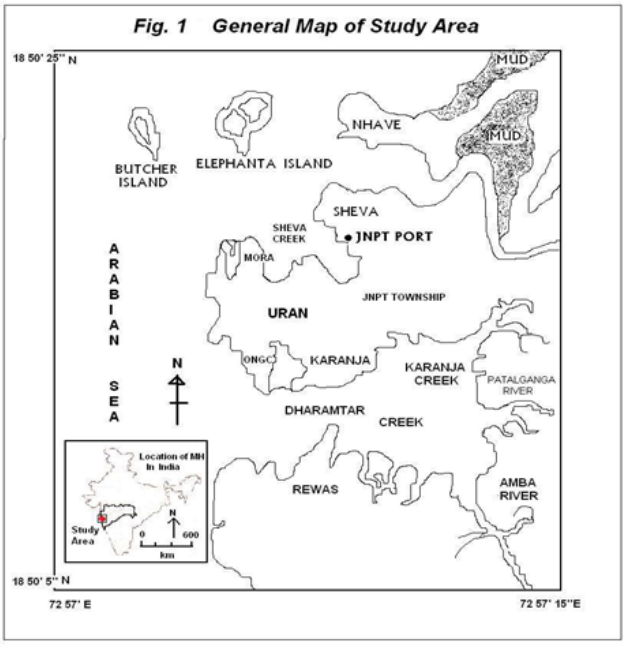

Fig. 1 – General Map of Study Area

Species diversity of fin-fish resources

For present investigation, two stations/landing centers namely Mora along Sheva creek and Karanja along Dharamtar creek were selected for qualitative assessment of species diversity fin-fishes. The landing centers were regularly visited monthly from Apr 2009 to Mar 2011 and the specimens were collected directly from the net and carried to the laboratory in icebox for further investigation. Fishes were also collected from all types of gears used along Uran coast and were identified up to species level following the work of Day [12].

RESULTS AND DISCUSSION

The data on species diversity of marine fishes revealed the presence of 31 species of fishes from Uran coast. Of this 3 species of Chondricthyes representing 2 genera and 2 families and 28 species of Osteicthyes representing 28 genera and 23 families were recorded from both the landing centers (Table - 1). Of the recorded species, 55 % belonged to Order Perciformes, 10 % to Clupeiformes, 6 % each to Rajiformes, Mugiliformes and Anguilliformes, 3 % each to Aulopiformes, Carcharhiniformes, Pleuronectiformes, Siluriformes and Tetraodontiformes. The total number of species, in alphabetical order of families is given in Table 1.

During present investigation, fishes of Order Perciformes were predominantly recorded from both the landing centers. *Mugil cephalus*, *Gerres filamentosus*, *Terapon jarbua*, *Boleophthalmus boddarti*, *Scatophagus argus*, *Lates calcarifer*, *Johnius soldado* and *Coilia dussumieri* were recorded abundantly. Several more species with wider distribution may be added to this list in future by intensive explorations.

Biodiversity and community structures are now recognized to be important determinants of ecosystem functioning. In this regard, the marine ecosystem has been studied to a much lesser extent compared to the terrestrial [13]. The number of estimated living fish species might be close to 28,000 in the world today [7]. Day [12] has described 1418 species of fish under 342 genera from the British India. Talwar [14] has described 2546 species of fish belonging to 969 genera, 254 families and 40 orders. James [15] reported that for achieving the goals of conservation of fisheries resources in general and to secure the future of exploited fisheries, there is need for reducing fishing efforts.

Rathod et al [16] has reported 67 species of fishes in the Thane creek, Mumbai and observed that various human activities like industrial effluents, domestic waste disposal, reclamation, sand dredging and eradiation of mangrove flora have deteriorated the creek causing decline in fin-fish fauna during last two decades.

Table 1: Species diversity of fin-fishes from Uran (Raigad), Navi Mumbai, Maharashtra

No.	Order/Family	Binomial Name	Common Name
	Anguilliformes		
1	Muraenidae	*Gymnothorax pseudothyrsoideus* (Bleeker)	Moray Eel
2	Congridae	*Conger cinereus* (Ruppell)	Conger Eel
	Aulopiformes		
3	Synodontidae	*Harpadon nehereus* (Hamilton)	Bombay Duck
	Carcharhiniformes		
4	Carcharhinidae	*Scoliodon sorrakowah* (Maller-Henle)	Dog-sharks
	Clupeiformes		
5	Engraulidae	*Coilia dussumieri* (Valenciennes)	Grenadier anchovy
6	Engraulidae	*Thryssa mystax* (Bloch and Schneider)	Moustached Thryssa
7	Clupeidae	*Tenualosa ilisha* (Hamilton)	Hilsa Shad
	Mugiliformes		
8	Mugilidae	*Mugil cephalus* (Linnaeus)	Striped Mullet
9	Mugilidae	*Chelon macrolepis* (Smith)	Big scale Mullet
	Perciformes		
10	Sparidae	*Argyrops spinifer* (Forsskal)	Red Sea Bream
11	Gobiidae	*Boleophthalmus boddarti* (Pallas)	Mudskipper
12	Scombridae	*Euthynnus affinis* (Cantor)	Little Tuna
13	Scombridae	*Rastrelliger kanagurta* (Cuvier)	Indian Mackerel
14	Gerreidae	*Gerres filamentosus* (Cuvier)	Whipfin Mojorra
15	Sciaenidae	*Johnius soldado* (Lacepede)	Croaker
16	Sciaenidae	*Sciaena dussumieri* (Cuvier)	Dhoma
17	Centropomidae	*Lates calcarifer* (Bloch)	Sea Bass
18	Trichiuridae	*Lepturacanthus savala* (Cuvier)	Ribbon-fish
19	Carangidae	*Megalaspis cordyla* (Linnaeus)	Mackerel Scad
20	Carangidae	*Parastromateus niger* (Bloch)	Black Pomfret
21	Stromateidae	*Stromateus argenteus* (Euphrasen)	Silver Pomfret
22	Polynemidae	*Polynemus tetradactylus* (Shaw)	Indian Salmon
23	Pricanthidae	*Priacanthus hamrur* (Forsskal)	Bull eye Scad
24	Scatophagidae	*Scatophagus argus* (Linnaeus)	Spotted Scat
25	Terapontidae	*Terapon jarbua* (Forsskål)	Three-striped Tiger fish
26	Cichlidae	*Tilapia mosambica* (Peters)	Blue tilapias
	Pleuronectiformes		
27	Cynoglossidae	*Cynoglossus macropepidotus* (Bleeker)	Large scaled tonguesole
	Rajiformes		
28	Dasyatidae	*Himantura bleekeri* (Blyth)	Bleeker's whipray
29	Dasyatidae	*Himantura gerrardi* (Grey)	Sharpnose stingray
	Siluriformes		
30	Bagridae	*Mystus seenghala* (Sykes)	Cat fish
	Tetraodontiformes		
31	Tetraodontidae	*Tetraodon nigroviridis* (Marion de Proce)	Puffer fish

Tayade and Rakesh Kumar [17] have reported fish mortality in Mumbai Coastal Region during October 2005 and several fish species were observed to be dead along the Mumbai coast such as Gateway of India, Juhu, Dadar and Khar Danda.

The coastal environment of Uran has been under considerable stress since the onset of other industries and JNPT since 1989. Hectic activities of Container Freight Stations (CFS), urbanization, industrialization and reclamation in the stretch of creek around Uran, result in the loss of mangrove biodiversity. Several incidences of coastal pollution occur because of leakage/discharge of transporting materials along with industrial effluents.

Disposal of domestic wastes and untreated or partially treated industrial effluents in coastal region of Uran, Navi Mumbai have depleted coastal resources, public health risk and loss of coastal and marine biodiversity [18]. Sighting of dead fish surfacing in creeks of Mumbai and Navi Mumbai (Panvel creek, Vashi creek, Belapur creek etc.) is common from last few years affecting the livelihood of fishermen. Dumping of industrial effluents, untreated sewage and unchecked encroachment along the coastal line have resulted in deterioration of water quality and incidences of industrial pollution are common in creeks of Mumbai and Navi Mumbai. Slaughtering of mangroves from Navi Mumbai region due to over exploration, unsustainable demand and reclamation have resulted in destruction of marine life [19, 20, 21, 22].

In conclusion, it is stated that, at present coastal environment of Uran shows moderate species diversity of marine fishes. Since no earlier reports are available on fin-fish diversity of Uran, data presented here can be taken as a baseline data in knowing the status of marine fishes and effect of industrial development on it.

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