



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Ref No : IJCRT/Vol 10/ Issue 12/ 496

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Registration ID : IJCRT_229264

Paper ID : IJCRT2212496

Title of Paper : QUALITATIVE STUDY OF FISHERIES SPECIES DIVERSITY

Impact Factor : 7.97 (Calculate by Google Scholar) | License by Creative Common 3.0

Publication Date: 27-December-2022

DOI : <http://doi.one/10.1729/Journal.32503>

Published in : Volume 10 | Issue 12 | December 2022

Page No : e418-e425

Published URL : http://www.ijcrt.org/viewfull.php?&p_id=IJCRT2212496

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Notification : **UGC Approved Journal No: 49023 (18)**

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Editor In Chief

International Journal of Creative Research Thoughts - IJCRT
(ISSN: 2320-2882)



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Qualitative Study of Fisheries Species Diversity

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ABSTRACT

*Ulhas River Estuary and Thane creek are two adjacent brackish water bodies lying in the vicinity of Thane City. These are highly impacted by various anthropogenic activities mainly due to urban, industrial, and reclamation activities. Artisanal fisheries from these water bodies have been under threat for decades. The qualitative fisheries diversity study revealed that the water body has declined further in fisheries catches. Nevertheless, a total of 31 fisheries species were observed in the study. Some species viz. *Mystus gulio*, *Oreochromis mossambicus*, and bivalves which were previously reported to be abundant were found to be dwindling in the present scenario. However, species like mullets, crabs, *Acetes indicus*, shrimps sciaenids, and clupeiformes were abundant in the present study. Moreover the marketing and dealing have no proper facilities. The perennial estuarine fish species were high in landings followed by estuarine seasonal species. The marine migratory fish dominated the landing as compared to the riverine migratory species.*

Keywords: Qualitative fisheries diversity, Ulhas River Estuary, Thane Creek, Artisanal fish, small-scale fisheries,

INTRODUCTION

The fisheries play important role in the livelihood of the local fishermen community in the vicinity of various water bodies. The estuaries and harbour marine and freshwater fishery species and support an artisanal fishery. In recent years the inland waters in the vicinity of urban areas have received lots of pollution pressure due to increasing industries and human population, the world over (FAO, 2007; Barletta, 2012). It has been found that many such urban water bodies been declined in fisheries due to various anthropogenic activities (Pawar, 2011; Chaudhari et al., 2012; Krina Kumar and Rajan, 2012; Lima et al., 2016; Paul et al., 2018; Barletta and Lima, 2019; Kurve and Patil, 2019).

The fisheries sector has been contributing to the socioeconomic development of India for centuries. Presently it is a source of over 14 million people. The total fishermen population as per Livestock Census, 2003 was 14,485,354, which includes 4,696,158 males, 4,033,963 females and 5,755,233 children. Fishermen engaged full-time in fishing operations were 933,124 and part-time were 1,072,079 (Handbook on Fisheries Statistics, 2014). Artisanal fisheries, classified by FAO as small-scale fisheries are neglected in India (Muralidharan,

2017). Thane is credited with 112 km of coastal lines and about 2 560 mechanized boats against 318 non-mechanized boats engaged in fishing activities (FAO, 2007). FAO (2007) reported that Thane had 427 tonnes of brackish water prawn landing alone. Quadros and Athalye (2012) reported a 75% decline in fish catches from the shallow area of TC during their study. Artisanal fisheries of Thane from URE and TC have been under a declining phase since 1996 (Rathod, 2016) in addition the COVID-19 pandemic lockdown worsened the situation. FAO (2007) reported that Thane had 427 tonnes of brackish water prawn landing alone.

Ulhas River Estuary (URE) and Thane Creek (TC) lie near the Thane City near Mumbai, Maharashtra State, India. The estuarine part of the Ulhas River commences from S-E (Lat. 19° 16' N and Long. 72° 45' E) near Kalyan –Dombivli railway station head wards, meanders for about 40 km. before it joins the Arabian Sea towards N-E at Vasai creek situated between the (Latitude 18° .45' to 19° .16' N and longitude 72° .42' to 73° .20', E). Whereas Thane Creek occurs between Latitude 19°, 00 to 19°.15; longitude 72°.55 to 73°.55 eastwards of Thane City. It is 26 km long opening at its northern end to the Ulhas River Estuary by a narrow connection. The creek receives both treated and untreated water domestic as well as industrial wastewater from the nearby urban areas. It is 26 km long opening at its northern end to the Ulhas River Estuary by narrow connections. The Creeks receive both treated and untreated water domestic as well as industrial wastewater from the nearby urban areas. The fishery from these two water bodies has been historically recorded as the support of the economy of the local population.

Thane city has been overpopulated for the last few decades due to immigration from state the as well as outer people due to the economic downfall at their native places. This has put enormous pollution pressure on the existent inward water bodies in the vicinity viz. Ulhas River Estuary (URE) and Thane Creek (TC). However, 30% of the population in Thane City is belong to the fishing community. It has been observed in recent years that most of the people from the fishermen community of Thane City have abandoned fishing due to a decline in the ambient fisheries (Rathod and Patil, 2012). It has been reported earlier about the decline in fisheries from the ambient water bodies (Quadros and Athalye, 2012).

The present study envisages characterizing the distribution pattern of fish species diversity through the survey of the fish market post-COVID-19 pandemic Lockdown. The study will carry the out frequency of occurrence from the capture fisheries landings from URE and TC through a survey of their respective landing centres and local markets. The study will provide a database and also will be compared with earlier similar findings from the ambient water bodies. The study will carry the diversity of fishes from the capturing landing URE and TC through the local market. The study will provide a database and will compare it with earlier data.

MATERIAL AND METHODS

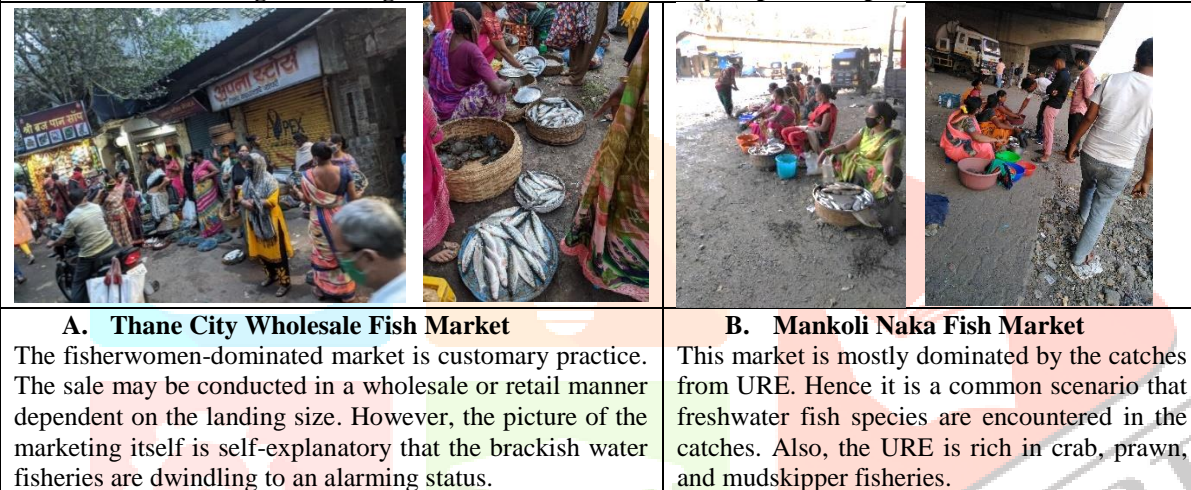
The study was carried out in a phase: data collection and data analysis. The primary data collected by carrying out field surveys were collected for a period of three months from October 2020 to December 2020 covering maximum fish catch landing centers and the ambient retail/wholesale markets. The According to earlier studies, the period stands in the Early-Post-Monsoon (EPM) season, which is the second-highest season in fish catches (Rathod, 2016). The fish landing centers at Vashi, and Ghasoli along Thane Creek whereas Kasheli- Kalher and

Kevani-Diva located along Ulhas River Estuary, were studied. The wholesale fish market at Thane and retail markets at Vashi, Ghansoli, Airoli, Vitawa, Mankoli, Kalwa, Kharegaon, and Kalher, were studied.

Sampling

The fish market where visited regularly or the fishes were observed and identified the data of fish diversity was also collected and studied through the information provided by the local fisherman. The study was carried out at the landing centres and wholesale markets of estuarine and creek fisheries (Fig.2). Fishes were identified and recorded on observation cards. The species-wise occurrence and ‘Catch Density’ (quantity) of fish caught were recorded on spot. Unidentified fish were carried to the laboratory for identification using relevant literature (Day, 1889; FAO, 1984; WoRMS).

Fig.1: The Glimpses of Landings of Fish in the Local Markets viz. Thane Main Market and Mankoli Naka Market showing Marketing Procedure of Commercially Important Species.



RESULTS AND DISCUSSION

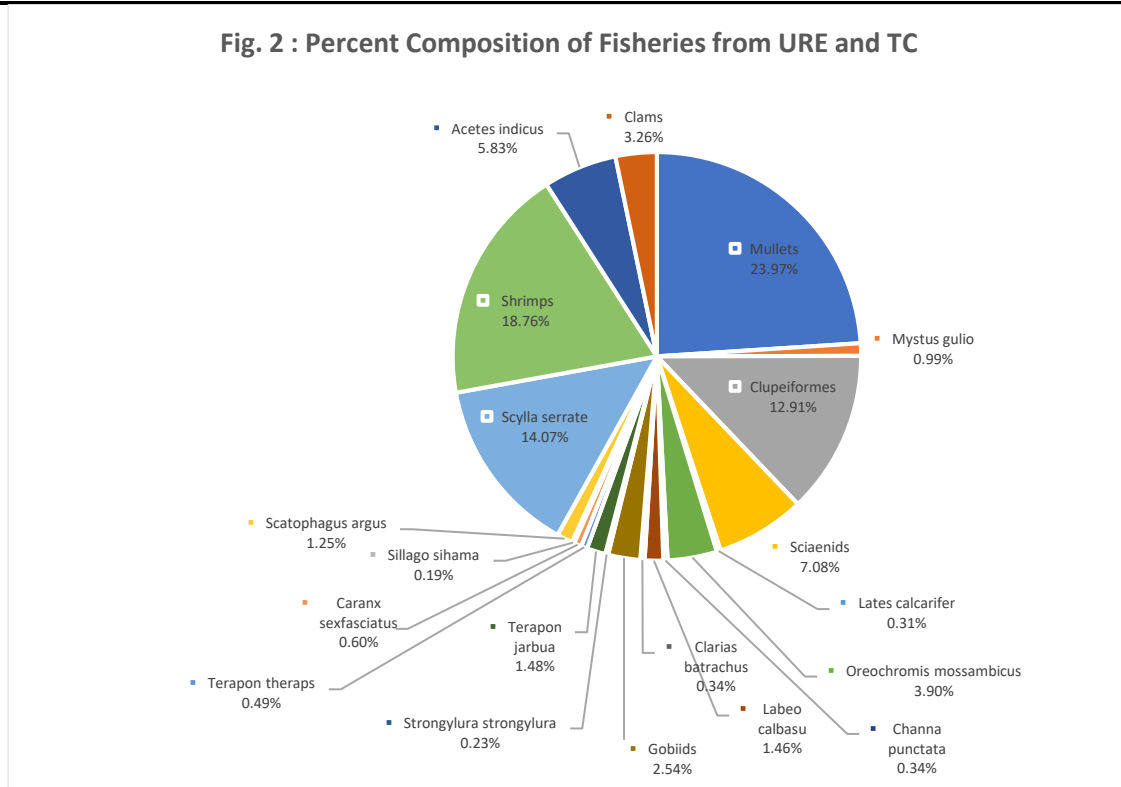
The pooled data of the abundance regime of fish catches from URE and TC were dominated by mullets, clupeids, *Acetes indicus*, shrimps, and crabs (*Scylla serrata*). *Oreochromis mossambicus* was moderate (Fig.2). As an individual species, the highest catch was observed for *Scylla serrata*. The species diversity was represented by a total of 31 species along with some commercially important species viz. mullets, crabs, *Acetes indicus*, shrimps sciaenids, and clupeiformes. Others were *Mystus gulio*, *Megalops cyprinoides*, *Lates calcarifer*, *Oreochromis mossambicus*, *Boleophthalmus dussumieri*, *Labeo calbasu*, *Strongylura strongylura*, *Trypauchen vagina*, *Terapon spp.*, *Caranx sexfasciatus*, *Sillago sihama*, *Scatophagus argus*, and *Channa punctata*. Clams were contributed by four species but the catch was negligible (1.71%) (Table1, Fig.2 and Fig.4).

Table1: Abundance of fish Species from the Survey markets in EPM Season from URE and TC

Category	Species	Local Name/ Common Name	Family	Abun.	Grp. Percent	Percent
Estuarine Perennial	<i>Mugil cephalus</i>	Mangin/ Flathead grey mullet	Mugillidae	+++++	46.61	14.08
	<i>Planiliza subviridis</i>	Boi/ Greenback mullet	Mugillidae	++++		7.96
	<i>Paramugil paramatus</i>	Boi/ Broad-mouth mullet	Mugillidae	++		3.93
	<i>Mystus gulio</i>	Chimni/ Long whiskered catfish	Bagridae	+		0.99
	<i>Boleophthalmus dussumieri</i>	Nivti/ Eshlambo Mudskipper	Oxudercidae	+		0.35
	<i>Trypauchen vagina</i>	Kaleti/ Burrowing goby	Gobiidae	+		0.09
	<i>Scylla serrata</i>	Chimbori /Mud crab	Portunidae	+++++		15.31
	<i>Oreochromis mossambicus</i>	Kala masa/ Mozambique tilapia	Cichlidae	++++		3.90
Estuarine Seasonal	<i>Lates calcarifer</i>	Khajura, Jitada, Fitadar/ Barramundi	Latidae	+	29.82	0.31
	<i>Sillago sihama</i>	Mudadi, Rinvi/ Northern whiting	Sillaginidae	+		0.19
	<i>Metapenaeus affinis</i>	Kolabi/ Jinga-shrimp	Penaeidae	+++++		10.79
	<i>Metapenaeus monoceros</i>	Kapsi, Chamari/ Speckled shrimp	Penaeidae	++++		8.99
	<i>Acetes indicus</i>	Jawla/ Paste shrimp	Sergestidae	+++		7.83
	<i>Meretrix meretrix</i>	Tigri, Shivali/ Asiatic hard clam	Veneridae	++		0.88
	<i>Meretrix casta</i>	Tisrya/ Backwater hard clam	Veneridae	++		0.36
	<i>Paphia malabarica</i>	Tigri, Shivali/ Tisreo	Veneridae	++		0.28
<i>Villorita cyprinoides</i>	Tisrya/ Black clam	Cyrenidae	+		0.19	
Marine Migratory	<i>Megalops cyprinoides</i>	Varas/ Indo-Pacific tarpon	Clupeidae	++	21.43	1.66
	<i>Terapon jarbua</i>	Naveri, Hajam/ Crescent grunter	Tetraodontidae	++		0.49
	<i>Terapon theraps</i>	Dada-dada / Banded grunter	Tetraodontidae	+		0.29
	<i>Tenualosa toli</i>	Bhing, Pala/ Toli shad	Clupeidae	+		0.25
	<i>Strongylura strongylura</i>	Toka/ Spot-tail needlefish	Belonidae	+		0.33
	<i>Caranx sexfasciatus</i>	Kala bangda/ Bigeye trevally	Carangidae	+		0.40
	<i>Coilia dussumieri</i>	Mandeli/ Goldspotted grenadier anchovy	Clupeidae	++++		10.64
	<i>Stolephorus indicus</i>	Modaka/ Snubnose anchovy	Engraulidae	+++++		0.36
	<i>Johnius carouna</i>	Dhoma/ Caroun Croaker	Sciaenidae	++		6.56
	<i>Johnius amblycephalus</i>	Dhomi/ Bearded croaker	Sciaenidae	+		0.21
<i>Scatophagus argus</i>	Kaski, Dada, Vada/ Spotted scat	Scatophagidae	+		0.25	
Freshwater Migratory	<i>Labeo calbasu</i>	Kalbasu/ Orangefin labeo	Cyprinidae	+	2.14	1.46
	<i>Channa punctata</i>	Maral, Daku/ spotted snake head	Channidae	+		0.34
	<i>Clarias batrachus</i>	Magur/ walking catfish	Calriidae	+		0.34

The fishery catches from URE and TC were very alarming. TC lacked fishing activities in upper regions. While URE represented with sporadic fishing activities in riverine zones. Clam fishing was absent in TC entirely. Certain species which were recorded abundant viz. *Mystus gulio*, *Terapon* spp., *Lates calcarifer*, *Boleophthalmus dussumieri*, *Acetes indicus*, *Megalopes cyprinoides*, *Scylla serrata*, *Scatophagus argus* in previous study (Rathod, 2002) were dwindled to very low catches. However, species like *Anabas testudineous*, *Boleophthalmus boddarti*, *Acanthopagrus datnia*, *Eleotris amboinensis*, *Anodontostoma chacunda*, *Sciaena dussumieri*, *Kowala coval*, *Trichiurus savala*, and some *Engraulis* spp., were lacking from the catches in the present study.

Fig. 2 : Percent Composition of Fisheries from URE and TC



The fish landings were dominated by perennial estuarine fishes throughout the study period followed next by seasonal estuarine species. Marine migratory fish species were observed in the winter season only. Both seasonal estuarine and marine migratory species improved the landings during the winter season. The freshwater migratory species were negligible in the catches (Fig. 3). Rathod (2016) reported that freshwater fishes were caught in a considerable amount during the rainy season. Earlier studies (Tandel, 1984; Pejaver, 1984) also depicted that the catches from these two water bodies were very high in URE and TC. The decline in fish landing is highly alarming from not only a fishery point of view but also depicted the health of two ambient waterbodies. Over a period of 35 years the rate of fall in fish landings is very rapid and probably will exterminate the fisheries from URE and TC in near future.

Fig.3 Abundance of Fishery Species in URE and TC

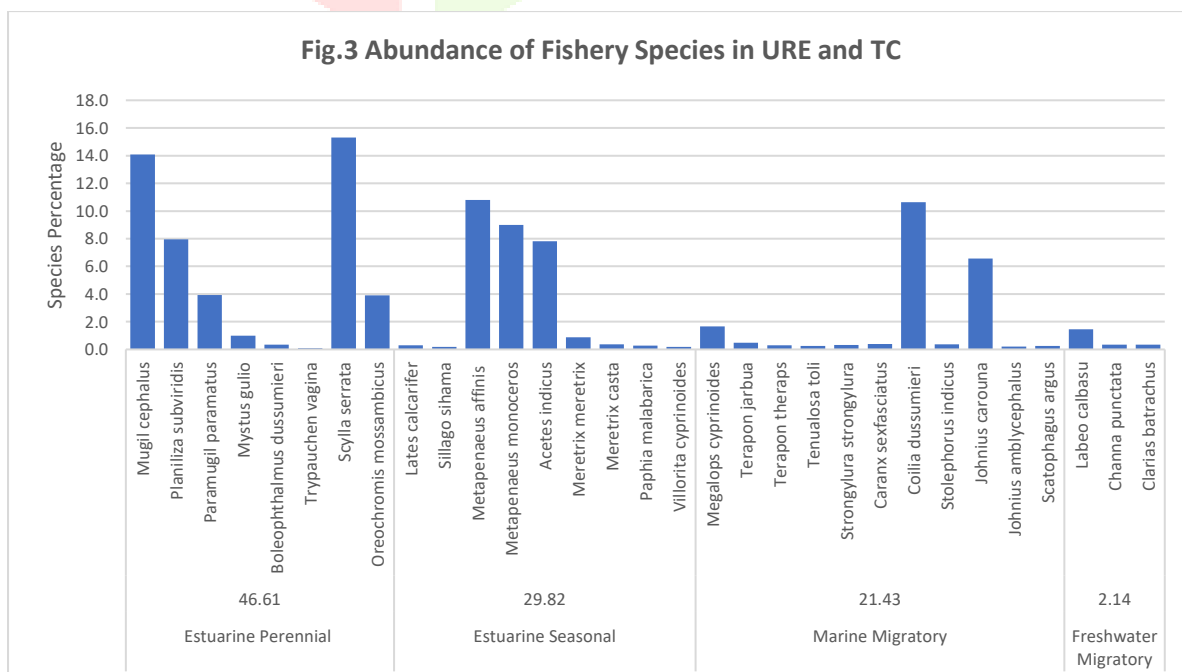


Fig. 4: Different fish species recorded from two study markets during the present study

		
<i>Mugil cephalus</i>	<i>Megalops cyprinoides</i>	Sciaenid spp. (Juveniles)
		
Clupeids, anchovy, sciaenids, shrimps	Shell fishes: prawns (<i>Penaeus semisulcatus</i>) and clams	<i>Caranx sexfasciatus</i> (Juveniles)
		
<i>Scylla serrata</i> (mud crab)	<i>Mugil</i> sp. Mullet	<i>Penaeus indicus</i> Shrimps (juveniles)
		
<i>Acetes indicus</i> Jawla	<i>Stolephorus indicus</i>	<i>Mystus gulio</i>
		
<i>Oreochromis mossambicus</i>	<i>Boleophthalmus dussumieir</i>	<i>Lates calcarifer</i> , Barramundi

The fish market was poor with landings, the catches were hardly about 25% as compared to an earlier study (Rathod, 2016). Fishers had no proper place and facilities for marketing. However, the wholesale dealings ended within an hour during the present study. In the present study clupeiformes and mullets dominated the catches in EPM (Table1 and Fig.2).

Mullet was most abundant (23.97%) followed by shrimps (18.76%), *Scylla serrata* (14.07%), clupeiformes (12.91%), Sciaenids (7.08%), *Acetes indicus* (5.83%), *Oreochromis mossambicus* (3.9%) and, Gobiid (2.54%). Whilst the others remained below 4% (Table1 and Fig.3). Rathod (2016) observed that the catches in URE and TC were moderately high in EPM season and were dominated by Mullet, *Mystus gulio*, *Scylla serrata*, prawns,

Oreochromis mossambicus, and bivalves (clams). In the present study, however, the *Mystus gulio*, *Oreochromis mossambicus*, and bivalves were negligible in catches in almost all the samples (Fig.2). The study indicated that the present quantitative landings of small-scale fisheries from URE and TC have declined to an alarming level. The TC has decline approximately eight-fold as compared to the landings observed in 2002 (Rathod *et al.*2002). the present study species like *Labeo calbasu*, *Lates calacarifer*, *Caranx sexfasciatus*, anchovies and shrimps were landed in a meager amount.

CONCLUSION

The study indicated that the present quantitative landings of small-scale fisheries from URE and TC have declined to an alarming level. The TC has decline approximately eight-fold as compared to the landings observed in previous studies. The fisheries catches of URE and TC were represented by a total of 31 fisheries species in the present study. The fish catches were very poor and dominated by mullets, shrimps, clupeids *Scylla serrata*, and *Acetes indicus*. The market conditions and overall artisanal fisheries have declined in present conditions. *Mystus gulio*, *Oreochromis mossambicus*, and bivalves which were earlier reported to be dominant in catches were found very poor in the present study.

ACKNOWLEDGEMENT

We would like to thank the Zoology Department from VPM's B. N. Bandodkar College (Autonomous) of science, Thane for supporting us and availing us of the facilities to carry out our study on the premises. We express our deep sense of gratitude to the Science Square and Research Scholar Program for allowing us and accepting our current mini-research project on fishery diversity study.

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