Research Article

LENGTH COMPOSITION OF COMMERCIALLY IMPORTANT FIN FISHES DURING MONSOON PERIOD AT HOOGHLY-MATLAH ESTUARINE SYSTEM, WEST BENGAL, INDIA

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ABSTRACT
A study has been carried out to know the length composition of commercially important fishes at Hooghly-Matlah estuarine system of West Bengal, India during monsoon period (June-September 2013). A total of 28 commercially important species were recorded during the study. The most commercially important species of the Hooghly-Matlah estuary were recorded *Tenualosa ilisha, Harpadon nehereus, Otolithoides pama, Trichiurus lepturus, Coilia ramcarati, Chelon parsia, Lates calcarifer, Polynemus paradiseus, Sillaginopsis panijus* and *Eleutheronema tetradactylum*. The main means of exploitation was found to be the bag net, trawl net, large seine, small seine, purse seine, drift net, lift net, cast net, set-gill net, set-barrier, traps, and hooks and lines. The species like *Tenualosa ilisha, Otolithoides pama, Lates calcarifer, Setipinna phasa, Trichiurus lepturus, Sillago sihama, Sardinella longiceps* were exploited below their size at first maturity. The species like *Polynemus paradiseus, Chelon parsia, Harpadon nehereus, Coilia ramcarati, Johnius dussumieri, Lutjanus fulviflamma, Chelon macrolepis, Scomberomorus guttatus, Sillaginopsis panijus, Osteogeneiosus militaris* were found to be exploited in mature stages. Reasons of reduction in fish catch and length were reported to be indiscriminate catches of juveniles and matured fishes by small mesh nets, habitat changes, pollution, the decline in water quality and destructive means of fishing practices.

INTRODUCTION

Estuaries are recognized as one of the most productive ecosystems of the world due to its rich nutrient contents and high primary production (Bhakta *et al*., 2018). The Hooghly-Matlah estuarine system on the Indian coast of Bay of Bengal is one of the largest and most productive estuaries in the country (Jhingran and Ghosh, 1978), covering a distance of about 295 km from the sea face. It is located between latitude 21º31´ to 23º30´ N and longitude 87º45´ to 88º45´ E and supporting a large scale of the fishery. The Hooghly-Matlah estuary leads to changes in the biodiversity of the estuary including fish diversity in different regions. More than 90% fish catch from Hooghly estuary comes from the high saline zone and more than 70% fish comes from winter bag net fishery. Other than bag net, gears operated includes small and large seines, trawls, set-gill, drift-gill, set-barrier, cast net, lift net, hooks and lines etc.

The annual average prawn and fish yield from the estuarine system increased from 3,204 tonnes during 1960-63 to 117,639 tonnes during 2010-11 (Ayappan, 2011). The average contribution of the fish species in the fishery was *Tenualosa ilisha* (51%), *Harpadon nehereus* (11.3%), *Otolithoides pama* (5.7%), *Setipinna* spp. (4.7%), *Trichurus* spp. (4.2%) and penaeid prawn (4.35%). Other important fish species were *Polynemus paradiseus, Polydactylus indicus, Eleutheronema tetradactylum, Lates calcarifer, Chelon parsia, Rhinomugil corsula, Pampus argentius, Coilia dussumieri*, etc. (Ayappan, 2011).

There are many reports of the fish bio-diversity of Hooghly-Matlah estuary system (Naidu, 1942; Gopalkrishnan, 1971; Menon *et al*., 1972; Dutta *et al*., 1973; Jingran, 1991; Sinha *et al*., 1996; Ghosh, 2008 etc.) and important commercial fisheries (Mitra *et al*., 1997; Nath *et al*., 2004; Roshith *et al*., 2013; Mogalekar *et al*., 2017). Studies of length composition and size at first maturity are useful for fishery resource management and to understand the level of their exploitation. To ensure the management regime, minimum exploitation size of respective species is prerequisite. The present study was provided length composition of 28 commercially important species during monsoon catch composition of Hooghly-Matlah estuarine system which will provide baseline information for fishing gear selectivity

and to minimize the level of growth as well as recruitment mortality rates.

MATERIALS AND METHODS

To study the length composition of the commercially important fishery in the catch structure during monsoon period of Hooghly-Matlah estuary, four landing centers were selected namely Diamond Harbour, Kakdwip, Namkhana and Fresergung on the basis of the abundance of fish landing and easy accessibility (Fig. 1). The study was conducted for a period of four months of the peak monsoon season (June-September 2013). To assess the size composition of the commercially important fishery total length of the fishes were measured by using a standard scale to nearest cm (0.01 cm). The observed fish species were harvested using gill nets, trawl nets, bag nets, cast nets or by collective methods by the local fishers. The maximum number of fishes has been identified at the field itself by the standard literature of Jhingran (1991), Talwar and Jhingran (1991), Jayaram (1999) and unidentified species were brought to laboratory identification after preserving in formalin (4-10%). The collected length composition data of commercially important species in the present study were compared with earlier literature available on Hooghly-Matlah estuarine system.

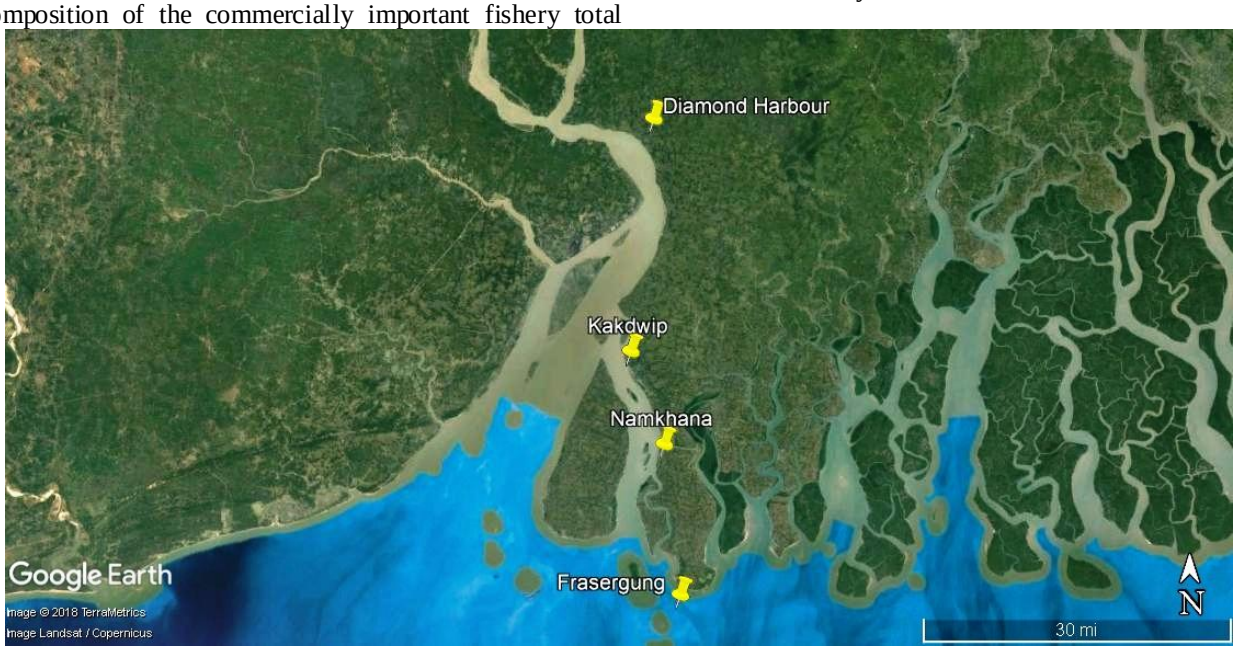

Fig. 1. Fish sampling sites under Hooghly-Matlah estuary

RESULTS AND DISCUSSION

Length ranges of 28 commercially important species were recorded to observe their exploitation level of size. The most important commercially important species of the Hooghly-Matlah estuarine system were recorded *Tenualosa ilisha, Harpadon nehereus, Otolithoides pama, Trichiurus lepturus, Coilia ramcarati, Chelon parsia, Lates calcarifer, Polynemus paradiseus, Sillaginopsis panijus* and *Eleutheronema tetradactylum* (Table 1). The main means of exploitation was found to be bag net, trawl net, large seine, small seine, purse seine, drift net, lift net, cast net, set-gill net, set-barrier, traps, and hooks and lines.

The species like *Tenualosa ilisha, Otolithoides pama, Lates calcarifer, Setipinna phasa, Trichiurus lepturus, Sillago sihama, Sardinella longiceps* were exploited below their size at first maturity which needs to be addressed by certain conservation measures.

The species like *Polynemus paradiseus, Chelon parsia, Harpadon nehereus, Coilia ramcarati, Johnius dussumieri, Lutjanus fulviflamma, Chelon macrolepis, Scomberomorus guttatus, Sillaginopsis panijus, Osteogeneiosus militaris* were found to be exploited in mature stages.

Table 1. Length ranges of commercially important fish species of Hooghly-Matlah estuary during the monsoon period.

Sl. No.	Species	Present study		Mitra *et al.* (1997)		Size at first maturity* (mm)
		Size range (mm)	Mean size (mm)	Size range (mm)	Mean size (mm)	
1.	*Tenualosa ilisha* (Hamilton, 1822)	220-542	327	210-550	356	340
2.	*Polynemus paradiseus* Linnaeus, 1758	120-170	139	63-248	160	F-145 M-130
3.	*Chelon parsia* (Hamilton, 1822)	120-180	141	48-193	106	F-105-115 M-95-105
4.	*Otolithoides pama* (Hamilton, 1822)	150-250	179	20-230	115	254
5.	*Lates calcarifer* (Bloch, 1790)	170-550	253	213-451	293	370-700
6.	*Harpadon nehereus* (Hamilton, 1822)	110-260	197	51-290	174	195
7.	*Setipinna phasa* (Hamilton, 1822)	120-170	137	--	--	200
8.	*Trichiurus lepturus* Linnaeus, 1758	370-570	425	--	--	463
9.	*Coilia ramcarati* (Hamilton, 1822)	140-170	155	--	--	F-123
10.	*Arius maculatus* (Thunberg, 1792)	290-345	217	--	--	--
11.	*Sardinella longiceps* Valenciennes, 1847	140-180	159	--	--	163
12.	*Pampus argenteus* (Euphrasen, 1788)	120-210	193	--	--	--
13.	*Pampus chinensis* (Euphrasen, 1788)	140-230	195	--	--	--
14.	*Parastromateus niger (Bloch, 1795)*	180-300	250	--	--	--
15.	*Scomberoides lysan* (Forsskål, 1775)	250-550	465	--	--	--
16.	*Johnius dussumieri* (Cuvier, 1830)	220-290	239	--	--	115
17.	*Lutjanus fulviflamma* (Forsskål, 1775)	260-290	278	--	--	171
18.	*Setipinna taty* (Valenciennes, 1848)	110-150	127	--	--	--
19.	*Chirocentrus dorab* (Forsskål, 1775)	250-390	351	--	--	--
20.	*Chelon macrolepis* (Smith, 1846)	210-290	257	--	--	230
21.	*Eleutheronema tetradactylum* (Shaw, 1804)	23-45	36	--	--	29
22.	*Scomberomorus guttatus* (Bloch & Schneider, 1801)	370-505	455	--	--	400
23.	*Sillaginopsis panijus* (Hamilton, 1822)	280-340	305	--	--	120
24.	*Sillago sihama* (Forsskål, 1775)	155-245	176	--	--	225
25.	*Bregmaceros mcclellandi* Thompson, 1840	50-70	63	--	--	--
26.	*Osteogeneiosus militaris* (Linnaeus, 1758)	230-260	245	--	--	F-184 M-164
27.	*Coilia dussumieri* Valenciennes, 1848	150-180	163	--	--	91
28.	*Lepturacanthus pantului* (Gupta, 1966)	350-510	425	--	--	--
29.	*Setipinna* spp.	--	--	40-180	121	--
30.	*Trichiurus* spp.	--	--	180-700	415	--
31.	*Coilia* spp.	--	--	30-230	123	--
32.	*Arius jella* Day, 1877	--	--	60-120	122	--
33.	*Otolithoides biauritus* (Cantor, 1849)	--	--	20-270	147	--
34.	*Symphodus cinereus* (Bonnaterre, 1788)	--	--	90-290	187	--
35.	*Ilisha elongata* (Anonymous [Bennett], 1830)	--	--	60-270	166	--
36.	*Leptomelanosoma indicum* (Shaw, 1804)	--	--	183-401	263	--

(*Size at first maturity was recorded from www.fishbase.org and other published literature, M=male fish, F=female fish, --= No record found)

Out of 14 species reported by Mitra *et al*. (1997), the species like *Arius jella, Otolithoides biauritus, Symphodus cinereus, Ilisha elongata* and *Leptomelanosoma indicum* (earlier known as *Polynemus indicus*) not found to be commercially important during the study period. Nath *et al*. (2004) studied the fishery resources and production potential of Hooghly estuarine system and reported 26 species of commercial importance. Out of 28 species recorded in the present study, 18 species were common with the study of Nath *et al*. (2004) and 10 species were found new which contributed to the monsoon commercial fish catches. Mitra *et al*. (1997) reported length size and mean length of 14 important species from Hooghly-Matlah estuarine system with higher mean length from the present study except for the species *Chelon parsia* and *Harpadon nehereus*. Out of 28 species the length ranges of 7 species *viz*., *Trichiurus lepturus, Sardinella longiceps, Pampus argenteus, Parastromateus niger, Johnius dussumieri, Chirocentrus dorab* and *Scomberomorus guttatus* coincides with the length ranges studied by Abdurahiman *et al*. (2004) during their study length-weight relationship of 51 commercially important marine fishes and shellfishes of the southern coast of Karnataka, India.

Nath *et al*. (2004) studied fishery resources and production potential of Hooghly-Matlah estuarine system and provided data on average length (mm) of 13 commercially important species. In the present study, nine species namely *Trichiurus* spp., *S. taty, H. nehereus, O. pama, P. paradiseus, P. argentius, O. militaris, C. ramcarati* and *T. ilisha* were found common from their studies but with larger mean length, the reason may be due to the present study limited to shorter duration and considered larger length groups.

Out of 28 species recorded as commercially important during the monsoon periods from Hooghly-Matlah estuarine system, hilsa was found to be the most dominant species followed by ribbon fishes and Bombay duck. *Tenualosa ilisha* which was the most dominant species during monsoon period catch structure also supported by the reports of Nath *et al*. (2004), they mentioned that monsoon (July-October) is found to be the prime season for hilsa fishery in the Hooghly-Matlah estuarine system.

The present study revealed that species like *T. ilisha*, certain croakers, *H. nehereus*, ribbon fishes, pomfrets, *Setipinna* spp. and *Coilia* spp., catches are reducing over the last few years. The reasons were found to be indiscriminate catches of juveniles and matured fishes by small mesh nets, habitat changes, pollution, the decline in water quality, destructive means of fishing practices etc.

CONCLUSION

Considering the current fishing pattern it can be predicted that much of the bio-resources in the Hooghly-Matlah estuarine system are likely to get depleted in near future due to catch of undersized fish by means of destructive means of fishing. Therefore, appropriate management action may be initiated not only to safeguard the fish but also the fisheries in a more comprehensive manner. The findings of the present study could be useful to the researchers, policy makers and stakeholders to prepare sustainable management plans of respective fishery resources of the estuary.

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