

VARIABILITY IN THE DISTRIBUTION OF PLANKTONIC FISH EGGS & LARVAE
IN THE NEARSHORE WATERS OFF BOMBAY

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ABSTRACT

Distribution of planktonic fish eggs and larvae in the nearshore waters off Bombay was studied during November 1979 to December 1980. Monthly samples were collected along three transects (Versova, Mahim and Thana) covering eleven stations which represented different environmental conditions. Fish eggs and larvae were common in the area of study with maximum abundance in December 1979 and April/August 1980. Mean density of fish eggs was maximum along the Mahim transect while population of larvae was more in the Versova transect. Total number of families of fish larvae represented in the collections increased from nearshore to offshore area.

INTRODUCTION

Previous reports on the distribution of zooplankton from the coastal waters of Bombay include some comments on the quantitative variation of fish eggs and larvae (Bal & Pradhan, 1945; Bapat, 1948; Pillai, 1968 and Gajbhiye, 1979). Later Gajbhiye *et al.* (1982) reported on the fish eggs and larvae from the polluted and unpolluted environments off Bombay based on data obtained from a few stations. In the present investigation extensive collections were made covering wider area stretching from the coast to almost 10 km offshore to evaluate the variability in the incidence of fish eggs and larvae in the nearshore waters of Bombay.

MATERIALS AND METHODS

Three transects off Versova, Mahim and Thana creek were selected for the present study (Fig.). The Versova and Mahim transects had 4 stations while the Thana transect covered only three stations. The creek stations of Versova and Mahim receive large amount of sewage. Station 1 of the Thana creek receives large quantity of industrial waste. The remaining stations had been fixed towards the offshore. Sampling was done from November 1979 to December 1980 from all the 11 stations covering flood and ebb tides. Zooplankton samples were

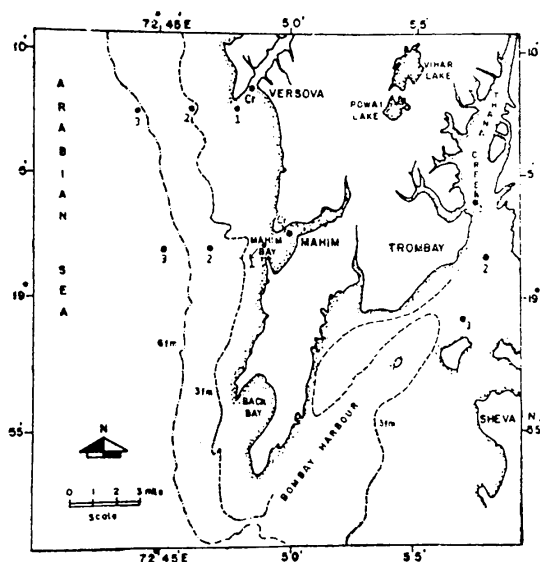


Fig. Map showing the location of stations

collected using a HT net (0.25m² mouth area, mesh size 0.3 mm) fitted with a TSK flow meter. Fish eggs and larvae were separated for quantitative and qualitative study. Water samples were collected from all stations for estimating the relevant environmental parameters.

RESULTS & DISCUSSION

Environmental Parameters

Detailed account on the physico-chemical conditions of the surveyed area has already been reported (Gajbhiye, 1982) and a few salient features are given below.

Water temperature showed a bimodal fluctuation with maximum in April/May and second peak in October/November. Salinity varied from 21.45 to 37.07‰ at Versova, while the range at Mahim and Thana creek were 1.79–36.40 & 5.17–36.93‰ respectively. Dissolved oxygen values for the transects of Versova, Mahim and Thana creek were 0.0 to 8.72, 0.0 to 8.26 and 1.34 to 8.12 mg/l respectively. The water quality was fairly good at offshore stations of Versova (st. 2 & 3) and Mahim (St. 3) with normal values of DO and nutrients. The polluted stations are characterised by low values of DO often reaching zero values during ebb tide and relatively high nutrients values (Gajbhiye, 1982).

12 DISTRIBUTION OF PLANKTONIC FISH EGGS & LARVAE OFF BOMBAY

Distribution of fish eggs and larvae

The group formed a common constituent of the zooplankton in the nearshore waters of Bombay and their population varied from place to place and season to season.

Versova transect : The frequency of occurrence of the eggs varied from 38.46–84.62% and the larvae from 61.54–92.31%. The percentage composition of both fish eggs and fish larvae fluctuated from 0.002 to 22.82% and 0.001 to 3.89% respectively. The mean density of the eggs and fish larvae were 67, 65, 33 & 23/100 m³ and 7, 27, 62 & 61/100 m³ respectively for creek, St. 1, St. 2 and St. 3. Highest number of eggs (427/100 m³) was recorded in the creek during flood tide in October 80, whereas the highest number of fish larvae (412/100 m³) was obtained at St. 3 during ebb tide in July '80. Average values of fish eggs and larvae for the flood and ebb tide indicate higher incidence during the flood period except at St. 3 (Table). Population maxima for fish eggs were noticed in December '79, March–April & August '80 while that for the larvae were observed in December '79, January, April–May & July '80. The fish larvae commonly represented in the collections belonged to the families Clupeidae, Carangidae, Engraulidae, Chirocentridae, Gobiidae, Polynemidae, Tetraodontidae, Apogonidae, Bregmacerotidae, Lutianidae, Serranidae and the other members of perciforms.

Table : Variation and mean density of fish eggs & larvae during flood (Fl.) & ebb tide. Values given are no/100 m³

Station	Tide	Range	Fish eggs		Fish larvae	
				Mean	Range	Mean
			VERSOVA			
Creek	Fl	11–338		128	1–81	11
	Ebb	3–21		5	1–7	2
St. 1	Fl	1–371		106	1–200	43
	Ebb	3–181		24	1–64	10
St. 2	Fl	4–280		35	1–400	65
	Ebb	10–300		30	1–218	58
St. 3	Fl	3–41		6	1–169	54
	Ebb	1–310		40	2–412	67
			MAHIM			
Creek	Fl	4–40		10	1	—
	Ebb	—		—	5	—
St. 1	Fl	1–280		53	1–125	25
	Ebb	1–1173		139	5–100	20
St. 2	Fl	2–1845		356	2–339	48
	Ebb	10–980		136	1–490	58
St. 3	Fl	3–3953		429	2–89	200
	Ebb	1–1510		168	2–363	70
			THANA			
St. 1	Fl	2–20		3	2–1050	98
	Ebb	3–12		2	3–46	16
St. 2	Fl	2–267		35	1–160	28
	Ebb	10–330		26	1–30	7
St. 3	Fl	3–4680		386	9–512	90
	Ebb	2–310		49	2–57	10

Mahim Transect : The frequency of occurrence of eggs varied from 0.0 to 84.62% while that of larvae fluctuated from 7.69 to 76.92%. The percentage composition of fish eggs and larvae varied from 0.0 to 25.68% and 0.0 to 1.96% respectively. The average density at creek, sts 1, 2 & 3 were respectively 5, 94, 246 and 299/100 m³ for eggs and 1, 23, 53 and 45/100 m³ for larvae. The highest density of eggs (3953/100 m³) was recorded at stations 3 during flood tide in November '80, whereas the maximum density of larvae (490/100 m³) was obtained from st. 2 during ebb tide in December '79. In general, average population of eggs and larvae were more during the flood period (Table). High density of eggs and larvae were noticed during November-December '79, April, August, and November '80. The different families of fish larvae encountered in the collections were Scorpaenidae, Clupeidae, Gobiidae, Chirocentridae, Synodontidae, Carangidae, Polynemidae, Lutianidae and other member of perciforms.

Thana Transect : The percentage of occurrence of fish eggs and larvae along the transect varied from 21.43 to 71.42% and 64.29-85.71% respectively. The percentage composition of eggs varied from 0.004-9.43 and that of larvae from 0.002-5.20%. The average population density of eggs at sts. 1, 2 & 3 were 3, 31 and 218/100 m³ and for larvae 57, 18 and 50/100 m³ respectively. The highest number of fish eggs (4680/100 m³) was recorded at st. 3 during flood in October '80. Maximum incidence of larvae (1050/100 m³) was recorded at st. 1 during flood tide in August '80. Invariably, eggs and larvae were recorded more during the flood tide than the ebb period (Table). Peaks in the incidence of eggs were observed during February, June and October/November '80 whereas population maxima of fish larvae were noticed during December '79, March and August '80. The family Bregmaceratidae, Serranidae, Carangidae, Gobiidae, Clupeidae, Tetraodontidae and member of perciforms were represent in the collections.

Fish eggs and larvae were commonly recorded in the area with maximum abundance in December 1979, April and August 1980, A direct correlation has been noticed between population maxima of zooplankton and abundance of fish eggs and larvae. Gae (1934) recorded high density of fish larvae from November to March along with fish eggs in Bombay harbour area. However, Pillai (1968) observed fish eggs in large numbers during March to May, rare in October & November and absent during the rest of the months.

Eventhough the abundance of fish eggs was more along the Mahim transect (av. 160/100 m³) the recorded number of fish larvae was more at Versova transect (av. 33/100 m³). The earlier report (Gajbhiye *et al*, 1982) also indicates more fish eggs at the Mahim area with lesser incidence of fish larvae.

14 DISTRIBUTION OF PLANKTONIC FISH EGGS & LARVAE OFF BOMBAY

The total number of families of fish larvae noticed along the Versova transect was more than that from the other two. From the nearshore to offshore stations there was marked increase in the number of families of fish larvae. It appears that the relatively unpolluted waters of the offshore region could provide a congenial environment for fish larvae which are very sensitive to the deleterious effect of pollution.

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