Distribution and abundance of fish eggs and larvae in Arasalar estuary, Karaikkal, south-east coast of India

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Abstract: The distribution and abundance of fish eggs and larvae have been studied at two Stations of Arasalar estuary. Eggs of Stolephorus sp., Mugil cephalus, Sardinella sp., Cynoglossus sp and the larvae of Stolephorus indicus, Ambassis commersoni, Terapon jarbua, Chanos chanos, Trichiurus sp Anguilla sp and Thryssa sp have been collected and identified. Environmental parameters such as temperature, salinity, pH and dissolved oxygen were also recorded. The present study clearly indicate the higher occurrence and abundance of fish eggs and larvae during March - July. The fair numbers of eggs and larvae indicate the existence of breeding ground within the estuary. Study on the physico-chemical parameters found that the abundance and distribution of fish eggs and larvae were influenced by the salinity of this estuary.

Key words: Abundance, Fish eggs, Fish larvae, Arasalar estuary.

Introduction

Information about the distribution and abundance of fish eggs and larvae of an area will help in a great deal in capture fisheries management and also useful in locating shoals of fish and their breeding grounds of the ecosystem (Manickasundaram et al., 1987). Though many works are available on the abundance and distribution of fish eggs and larvae in Indian waters (Venkataramanujam and Ramamoorthi, 1972; Kowtal, 1967; Prabhakara Rao, 1970; Manickasundaram et al., 1987; Manickasundaram and Ramaiyan, 1990), this type of works has not been probed in Arasalar estuary which is said to be having a great larval resource. Hence, the present study has been carried out to find out the availability, seasonal abundance and distribution of fish eggs and larvae of Arasalar estuary.

Materials and Methods

Arasalar estuary is situated in the Coromandal coast of India (Fig. 1). This estuary is wide and open type and the tidal influence is up to 10km in the upstream during high tide. Station 1 is situated near the mouth of the estuary with average depth 2.5m and the Station 2 is situated 3km away from Station 1 with average depth 3m. Fortnightly collection of fish eggs and larvae were made from the two Stations during January to December, 2002 using a plankton net made up of bolting silk having a mesh size of 0.076mm for 30 minutes at each Station. Collections were made early in the morning at 04.30 and 05.30hrs during full moon and new moon days both at low and high tides. Samples were preserved in 5% neutralized formalin. Fish eggs and larvae were identified by following the standard works of Jones (1950) and Manickasundaram and Ramaiyan (1990). Water temperature measured using a standard centigrade mercury thermometer. Salinity was measured with the help of a salinometer model E-2 and water pH using Elkco pH meter. Dissolved oxygen was determined by methods adopted by Strickland and Parsons (1972). Correlation values were calculated and significance level was computed by the methods of Fisher and Yates (1963).

Results and Discussion

In the present study, temperature varied between 23.2 and 30°C (Fig. 2). pH varied between 7.3 and 8.4 (Fig. 3). Salinity varied from 10 to 34‰ (Fig. 4). In general, higher temperature, pH and salinity are recorded during summer season and low during monsoon season. Dissolved oxygen varied from 3.8 to 6.3 ml/l with the higher values recorded during the monsoon season might be due to the monsoonal fresh water flood for higher solubility in low salinity and low temperature (Rajasegar, 2003).

In the present study, a total of 13 species of eggs and 16 species of larvae were recorded from both Stations. Of which, eggs of Stolephorus indicus, Thryssa sp., Cynoglossus sp., Leiognathus sp. Mugil cephalus, Caranx sp. and Ambassis sp. were observed from both Stations while, Terapon sp., Scomberoides sp., Decapterus sp., Platyccephalus sp., and Hilasa sp. were recorded only from Station 1 and Eutroplus sp. was...
Fig. 1: Map showing the study area.

Fig. 2: Monthly variation of temperature recorded from Station 1 and 2.

Fig. 3: Monthly variation of pH recorded from Station 1 and 2.
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Fig. 4: Monthly variation of salinity recorded from Station 1 and 2.

Fig. 5: Monthly variation of dissolved oxygen recorded from Station 1 and 2.

Fig. 6: Monthly variation of fish eggs and larvae recorded from Station 1 and 2.

The variation in salinity and dissolved oxygen is evident in the graphs. The salinity, depicted in Fig. 4, shows a general trend with slight fluctuations, while Fig. 5 illustrates the dissolved oxygen levels which appear consistent throughout the months.

The abundance of fish eggs and larvae is visually represented in Fig. 6, with the bars indicating the numbers per cubic meter. The peaks and troughs suggest seasonal variations.

The recorded abundance of eggs was more during April-May, and larvae were found in higher numbers in March. This may be due to the spawning of fishes during these months. The spawning of major fishes, including Ambassias sp., Mugil cephalus, Cynoglossus sp., and Leiognathus sp., occurred when the salinity (30–34‰) and temperature (30°C) were high. A definite relationship in the occurrence and abundance of fish eggs and larvae influenced by salinity was evidenced by the significant positive correlation value (r = 0.59 at Station 1; r = 0.61 at Station 2; P<0.05) observed between them.

The larvae of Sillago sihama, Ambassias sp., Terapon sp., Stolephorus indicus, Leiognathus sp., Sardinella sp., Chanos chanos, Spyraena sp., Tricanthus sp., Cynoglossus sp., Hilsa kelee, Sotipina taty, Scatophagus sp., Platyccephalus indicus, Siganus sp., and
Hemiramphus sp. were recorded in both Stations. The larvae of Ambassis sp., Terapon sp., Leiognathus sp. and Mugil cephalus were collected in fair numbers throughout the study period with the maximum occurrence during April. The eggs and larvae of finfishes are comparable to the other estuaries studied by Venkataramanujam and Ramamoorthy, 1972; Prabhakara Rao, 1970; Manickasundaram et al., 1987; Manickasundaram and Ramaiyan, 1990.

The larvae of Chanos chanos occurrence were high during October-November. This might be due to population breeding in October-December as reported by Tampi (1957). Siganus sp. was available with few numbers and was better during June-July period.

Maximum number of eggs was recorded during high tide in summer season (Fig. 6). It may be due to peak spawning activity (Balachandran, 1991) while the minimum was recorded during monsoon season due to the heavy rainfall and it could have washed away from the estuary. The present study indicates that salinity appears to be an important factor in the distribution of fish eggs and larvae of this estuary.

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