Current Research Journal of Biological Sciences 1 (1): 14-17, 2009
ISSN: 2041-0778

Distribution and Abundance of Finfish Larvae along Bay of Bengal (South East Coast of India)

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Abstract: In the present study, the distribution and abundance of Ichtyoplankton was made in Kodiakkaari and Arukattuthurai of Vedaranyam coast, south east coast of India. Both the station occupies an important place in the fishing area of Tamilnadu. Monthly sampling of Icthyoplankton were made for one year (September 2006 to August 2007) covering a stretch of 30 km. The Ichthyoplankton at both station composed of family *Scombridae, Mugilidae,Teraponidae, Lujanidae,Pomadasydae, Scianidae, Clupeidae, Carangidae, Latidae, Sphyraenidae, Engraulidae, Leiognathidae, Tetradentidae and Chirocentridae*. A maximum density (76/10m^3) of fin fish larvae was observed during summer followed by a secondary peak in postmonsoon season. In both the stations *Teraponidae* showed the major larval composition (15.27 and 14.05) and *Tetraodontidae* encountered lowest composition (3.05). Seasonal wise composition of Icthyoplankton refers that the abundance was maximum in manosoon (*Pomacentridae* 32.56 %) and minimum (*Tetraodontidae* 0.99%) in summer. Physicochemical parameters such as Temperature, pH, Salinity, Dissolved oxygen and Rainfall were also recorded from the stations in relation to the distribution and abundance of Icthyoplankton.

Key words: Abundance, Distribution, Icthyoplankton and Physico-chemical parameter

INTRODUCTION

Information about the distribution and abundance of fish larvae of an area will help in a great deal in capture fisheries management and also in location shoals of fish and their breeding grounds of the ecosystem (Manickasundaram *et al*., 1987). Information available on seasonal abundance of Icthyoplankton from Indian waters is meager. A thorough knowledge on the availability of fish larvae in a coastal ecosystem is essential as it is directly related to the successful implementation of fish forming practice of both brackish and marine waters (Jayabalan *et al*., 1984). It is essential to follow the cycle of events in there aspects so as to give valid predication regarding the natural fluctuations in the abundance of fish stock. In comparison with the considerable amount at knowledge available on the Icthyoplankon of Indian coastal waters. Mainly marine fishes, including those that are not resident species, spawn in or near productive coastal bays and estuaries (Nair, 1952; Wheatland, 1956; Richard 1959; Pearcy and Richards, 1962; Powels *et al*., 1984; Thangaraja, 1995). Hydrographic conditions that retain planktonic eggs and larvae within bays and estuaries (Doyle *et al*., 1993), together with enhanced densities of food, may allow developing larvae to grow rapidity into strong swimmers, thus helping them to avoid predators and resist being dispersed by currents (Bourne and Govani, 1993; Olney and Boenhlert, 1988). Sundaramanickam (2002) reported the distribution of the finfish larvae in relation to hydro biological parameters in Parangipettai coast and adjacent waters. Rajasegar *et al*. (2005) described the distribution of eggs and larvae in Arasalar estuary. Sundaramanickam *et al*., (2007) studied the assessment of tsunami impact on fish egg and larvae along Parangipettai, coast east coast of India.

Though many works are available on the abundance and distribution of fish eggs and larvae in Indian waters (Venkataramanujam and Ramamoorthi, 1972; Manickasundaram and Ramaiyan, 1990; Rajasegar *et al*., 2005). However, such studies are not attempted in Vadaranyam area. Hence, the present study to understand Icthyoplankon species compositions and abundance data can help to elucidated local patterns of distribution and spawning for non-residential as well as local species and determine an area's importance as a nursery ground. Icthyoplankton data can also help to clarify broad-scale trends of fish distribution and spawning ranges, such an area of interest is located around Kodiakkarai and Arukattuthurai coastal waters.

MATERIALS AND METHODS

Two stations were selected for the collection of fish Larvae station-I suited at Lat 10^o 14' 26N; Long 79^o 49' 25E and Station-II Lat 10^o 23' 16N; Long 79^{o}52' 46E. The Net used for collection was no.10 bolting silk with mesh size 158 mm. the Icthyoplankton collection were made. The volume of water filtered was quantified with the help of calibrated flow meter. Oblique plankton hours were made at a constant speed (5 km h^{-1}) for 15 min in each station. After collection, the samples were examined in living condition and were later preserved. Methods of

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collection and analysis are given elsewhere (Venkataramanujam and Ramamoorthi,1974). For the Identification Delsman, (1938) and Jones (1950, 1967) terminology was adapted in the present study.

RESULTS

Observation on the environmental characters were made to see their influence on the distribution of finfish larvae is related to the fluctuation in temperature and salinity the major peaks of larvae occur from January to March when the temperature and salinity decreases. There was no significant correlation observed between fish larval density and the environmental parameters such as salinity temperature, pH and dissolved oxygen (Fig. 1-4). It is significant note that a maximum number of fish larvae were collected during March and April indicating the spawning season during the premonsoon season. Generally, an increased volume of zooplankton was recorded during February (10.7 No/m^3) June (16.2 No/m^3) and September (14.9 No/m^3) co inside more or less the peak season of the occurrence of larvae.

Total density of fish larvae : The monthly occurrence of finfish larval density station I ranged between (8 lravae/10m^3 to 76 larvae/10^3 whereas at station II, it was ranged between 10 larvae/10m^3 to 65 larvae/10m^3. Both the stations maximum larval density was observed during summer season (Fig. 5). The minimum density of larvae were during monsoon.

Family wise composition: The percentage composition of the larvae of fish family such as *Scombridae, mugilidae, Teraponidae, Lujanidae, Pomadasydae, Scianidae, Clupeidae, Carangidae, Latidae, Sphyraenidae, Engraulidae, leiognathidae, Tetradentidae and Chirocentridae* were encountered during the present study (Fig. 6). However, the percentage composition of larvae varied from both the stations Scombridae formed the major component (St-I 10.12% and St-II 10.14%) and minimum component were *Chirocentridae* (2.61% and 2.72%).

Seasonal composition: In all the four seasons, the larvae belonging to the family Teraponide formed the dominant group during post monsoon seasons (26.09%) and minimum was *Tetrodentridae* (1.30%) Whereas during summer period *Clupeidae* formed the dominant group (17.22%) and minimum was (0.99%) *Teraponidae*. The premonsoon period the *Leiognathidae* (25.58%) formed the dominant group and the minimum was *Latidae* (1.16%). In the monsoon season *Pomadasydae* (35.26%) formed the dominant group and minimum *Carrangidae* (1.55%). Maximum number of bony fishes of the several taxa were represented during post monsoon followed by summer season (Fig. 7-8).

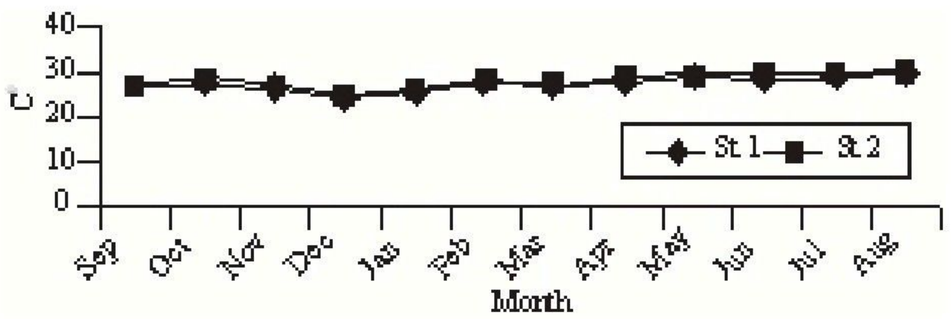

Fig. 1: Monthly variation in Temperature recorded during September 2006- August 2007 at Station 1 and 2

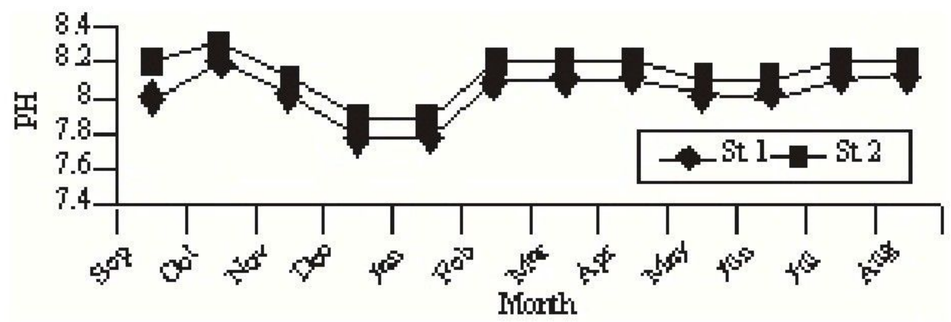

Fig. 2: Monthly variations in pH recorded during September 2006-August 2007 at Station 1 and 2

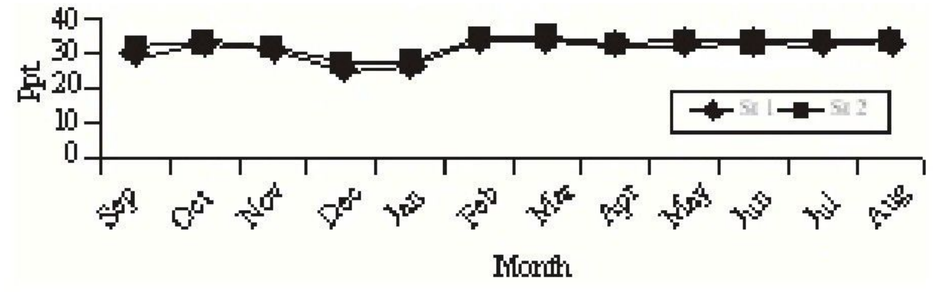

Fig. 3: Monthly variation in Salinity recorded during September 2006-August 2007 at Station 1 and 2

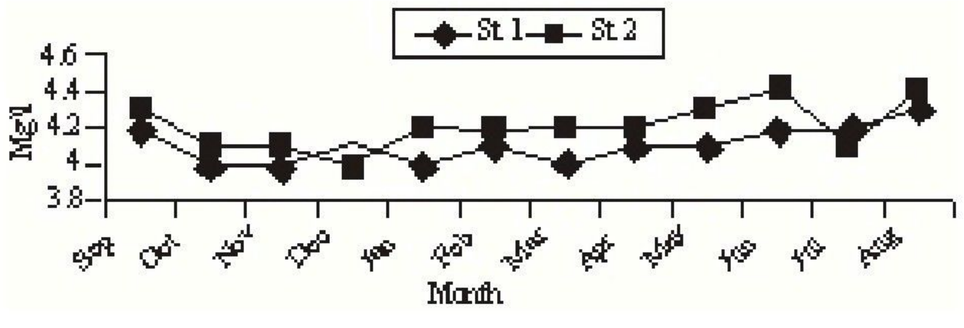

Fig. 4: Monthly variation in pH recorded during September 2006- August 2007 at Station 1 and 2

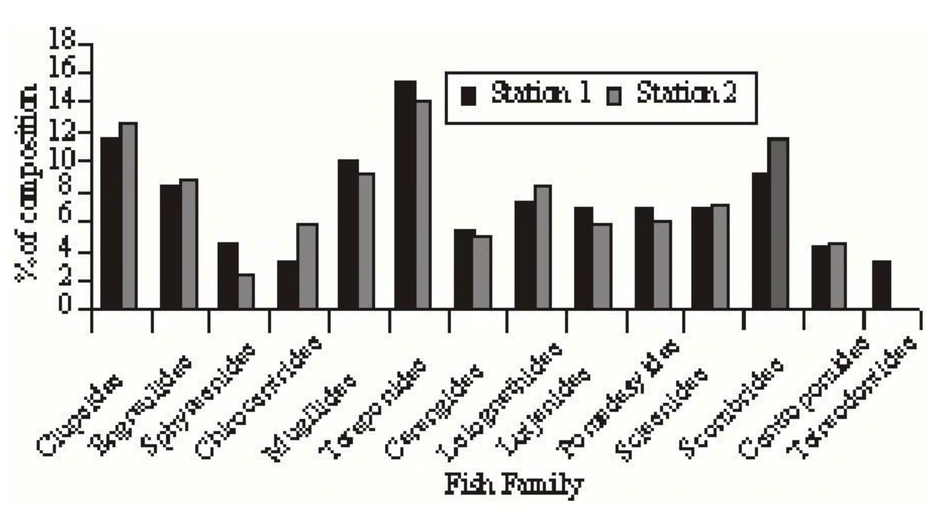

Fig. 5: Family wise composition of fish larvae at Station 1 and 2

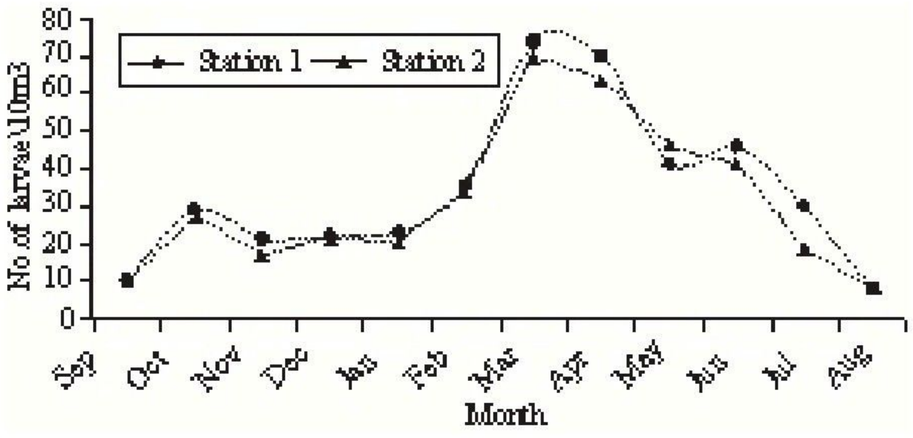

Fig. 6: Total density of finfish larvae at Station 1and 2

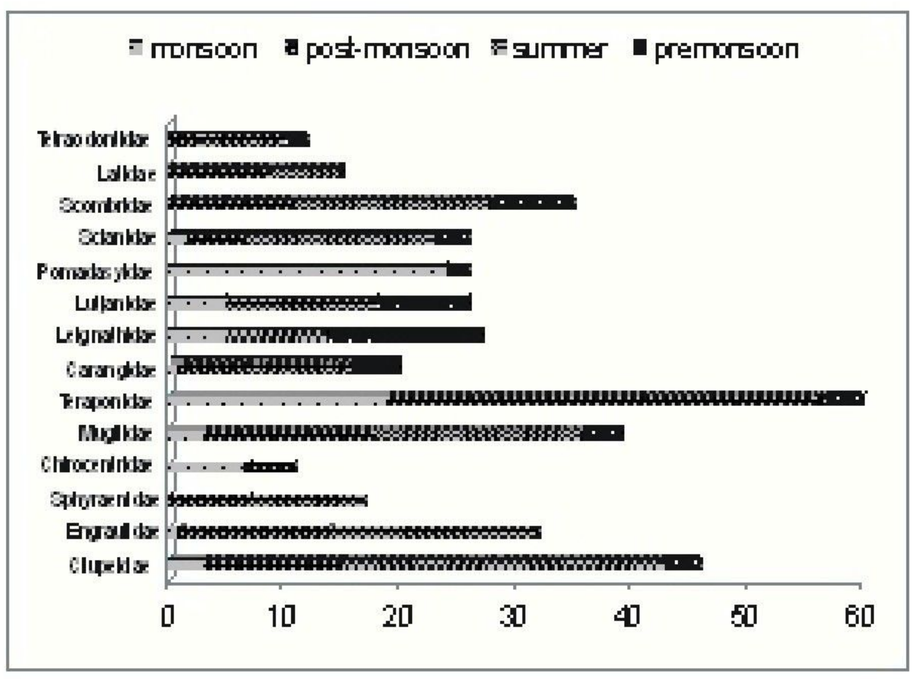

Fig. 7: Seasonal wise compositions of fin fish larvae at Station-1

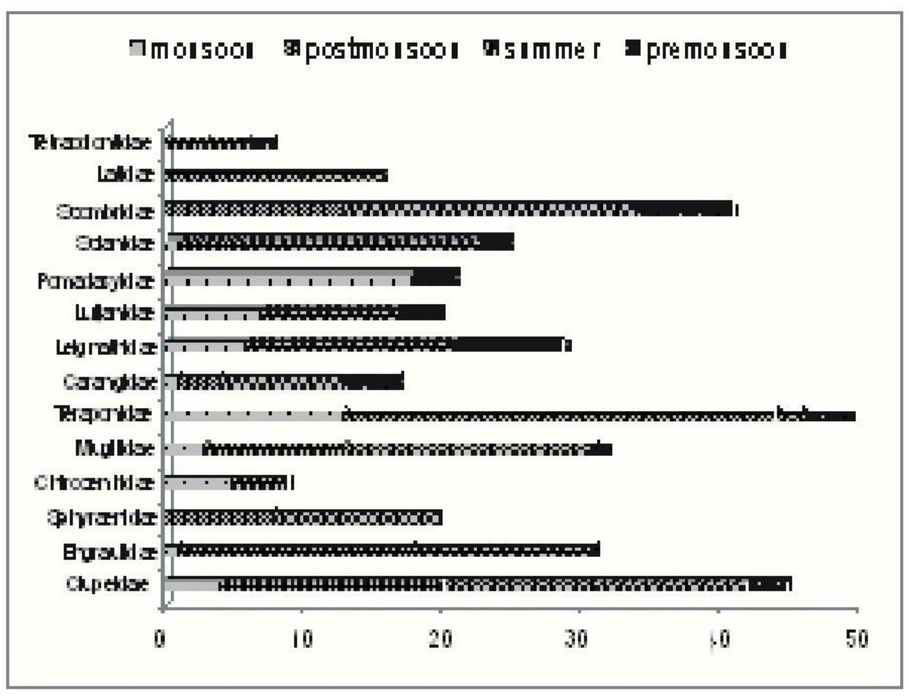

Fig. 8: Seasonal wise compositions of fin fish larvae at Station-2

DISCUSSION

The occurrence of fish larvae should be a seasonal sequence depending upon the distribution of each species and its spawning period, which are faith known for most of the species. However the higher density of fish larvae during the post monsoon season especially coincided with lower salinity and temperature condition and this might be due to the preference of fishes to spawn in optimal condition of salinity and temperature (Thangaraja, 1995). The heavy rain fall during monsoon considerably reduces the salinity of the coastal waters which again increases during the post monsoon season and because of this, most of the fishes spawn during the post monsoon season and finfish larvae were abundance in a salinity range between 31 to 34% and temperature 26.8 ºC to 29.8 ºC. Rainfall data shows inverse relationships with the distribution of finfish larvae (Rajasekar *et al.,* 2005) have also observed such an inverse relationship between the rainfall and the abundance of fish larvae. Marichamy and Siraimeetan (1984) observed two peaks in the distribution of fish larvae, the primary one was in January -February and the secondary one was in June – July associated with the low temperature and salinity in Tuticorin area. The population of fish can be divided roughly among those that spawn in the monsoon, post monsoon, summer, premonsoon and year round spawning. The type of seasonal spawning is prominent in species inhabiting cold waters. But those types of seasonal variation have also been observed in marine waters. The Icthyoplankton abundance is related to the fluctuations in temperature and salinity also assessed in Parangipettai coastal waters south east coast of India (Sundaramanickam, 2002). Venkataramanujam and Ramamoorthi, (1974) from Portonovo coastal waters and Rajasekar *et al.* (2005) from Arasalar estuary adjacent of Karaikkal coast some warm water species, the spawning period is extended from one season to another season (Quasim,1956) but in the present investigation a highly significant seasonal distribution of finfish larvae was noticed. At kodiakkarai cost the diversity varied from 8 larvae/10m^3 to 76 larvae/10m^3 are the larval density of Arkattuthurai ranged from (10 larvae/10m^3) to (65 larvae/10m3) the minimum density of finfish larvae was observed during monsoon season but the maximum was at post monsoon and summer season. It attributes the potential ecological conditions and high productivity is favorable breeding and nursery ground for several marine fishes in the south east coast of India. This information provides an additional source support to the intervention of fishery resource.

ACKNOWLEDGEMENTS

We would like to thank Prof. T. Balasubramaniyan, Director CAS in Marine Biology Annamalai University, for providing facilities for the duration of the research.

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