

Survey on Sound Producing Marine Fishes and Ichthyoplankters of Parangipettai Coastal Waters, Southeast Coast of India

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Abstract: An investigation on the planktonic fish eggs and larvae in Parangipettai (lat.11° 29'N and long.79° 49'E) coastal waters was carried out to know the spawning grounds of sound producing marine fishes in the area. The fishes were regularly collected from Annan Koil landing centre, Mudasalodai landing centre and Pazhayar landing centre from December, 2005 to November, 2006. Thirty two species of fishes capable of producing sound have been documented. These fishes belong to 4 major families namely Sciaenidae, Holocentridae, Pomadasysidae and Theraponidae. In Sciaenids, a pair of sonic muscles and air-bladder is the sound producing organ, whereas in Holocentrids (Squirrel fish) the well developed sonic muscles enable them to produce much more sound than other fishes, while in Pomadasysids and Theraponids pharyngeal teeth produce sound. The fish availability exhibits a monthly trend. In general, fish eggs occurred abundantly in post monsoon and post larvae, juveniles are abundant in monsoon. The fish population is also higher in post monsoon months.

Key words: Sound producing marine fish • Ichthyoplankters • Eggs and Larvae • Coastal waters • India

INTRODUCTION

An investigation on the planktonic fish eggs of Parangipettai coastal waters was carried out with a view to know more about the spawning grounds of marine fishes of this area. Studies on the seasonal abundance of the fish eggs and larvae from the east coast have reported [1-4] from the west coast [5]. A preliminary study of the juvenile fishes of the coastal waters from Madras water was also conducted [3]. The occurrence of fin fish larvae of different species of fish shows a seasonal sequence depending upon the distribution of each species and the spawning period [7]. Several authors have studied the seasonal distribution and abundance of finfish larvae from different parts of the world [8-11]. The composition and structure of larval communities and their relation to the environment is an important study to know about the profitable use of fishery resources [12-15]. Ichthyoplankton of fluctuations in the abundance of fish communities and as a means of examining stock/recruitment relationships [16]. Recently studied the Tsunami impact on fish eggs and larvae from the present study area [17]. However, the detailed description of eggs and larvae of sound producing fishes was not attempted earlier and hence the present report describes the sound

producing fish, the eggs and larval availability for the one year period are described herein.

MATERIALS AND METHODS

The present investigation is based on the finfish larval collections made during December, 2005 to November, 2006 from Parangipettai coastal waters (11° 29'N:79° 49'E). Sampling sites were 12 to 30 m depth ranges in SE & NE from Vellar river mouth. The net used for collection was of No.20 bolting silk with a mesh size of 158µm, measuring about one and half meters in length and 40.5cm in width at the origin. The net was towed along the surface for thirty minutes at the sampling sites. The plankton collections were made generally between 6 and 7 a.m for every collection except monsoon and inclement weather. Methods of collection, identification and analysis are based on standard research done [17-21].

RESULTS

Eggs, Larvae and Juvenile Fish: Sampling sites of 12 to 30 m depth range in SE & NE from Vellar river mouth in Parangipettai coastal waters. The eggs, larvae

Table 1: List of Sound Producing fishes of Parangipettai coastal waters

S.No	Family	Common Name	Species *Marine/Estuarine	Organ of sound production
1.	Sciaenidae (14 species)	Drummers and Croakers	<i>Kathala axillaris</i> (M) <i>Panna microdon</i> (E) <i>Pennahia macrophthalma</i> (M) <i>Otolithes ruber</i> (M) <i>Protonibea diacanthus</i> (M) <i>Dendrophysa russelli</i> (E&M) <i>Daysciaena albida</i> (E&M) <i>Nibea maculata</i> (M) <i>Nibea soldado</i> (M) <i>Johnius carutta</i> (E&M) <i>Johnius belangerii</i> (M) <i>Johnius macropterus</i> (M) <i>Johnius amblycephalus</i> (M) <i>Johnieops dussumieri</i> (M)	Air bladder
2	Holocentridae (7 species)	Squirrel fish/ Soldier fish	<i>Holocentrus rubrum</i> (Red soldier) <i>Myripristis murdjan</i> (Black tipped) <i>Holocentrus diadema</i> (Crown soldier) <i>Holocentrus ittodai</i> (Japanese soldier) <i>Holocentrus lacteo-guttatus</i> (White spotted) <i>Holocentrus caudimaculatus</i> (Spot tailed) <i>Myripristis pralinus</i> (Smooth cheeked)	Pharyngeal teeth and swimbladder
3	Pomadasyidae (8 species)	Grunts	<i>Pomadasys maculatus</i> (E&M) <i>Pomadasys hasta</i> (E&M) <i>Pomadasys guoraca</i> (E&M) <i>Pomadasys opercularis</i> (E&M) <i>Plectorhinchus nigra</i> (M) <i>Plectorhinchus cinctus</i> (M) <i>Plectorhinchus lineatus</i> (M) <i>Diagramma pictus</i> (M)	Pharyngeal teeth
4	Theraponidae (3 species)	Grunters	<i>Terapon jarbua</i> <i>Terapon puta</i> <i>Terapon therops</i>	Pharyngeal teeth swimbladder

Table 2: Phytoplankton distribution of Parangipettai coastal waters during the period Dec, 2005 to Nov 2006

Phytoplankton (cells/l)	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1 Diatoms Coscinodiscea	2186	2002	1733	2142	1428	3529	1705	2283	1736	7156	3917	4597
2 Tricertinae	1049	1240	1249	1025	928	708	1288	1003	1200	1195	1071	3157
3 Chaetocercea	1236	1439	1533	2330	1233	3955	1545	2125	1461	1908	2116	896
4 Biddulphoidea	1180	1564	1289	1485	1413	1315	1409	1416	1352	2477	4267	1202
5 Eucampiinea	0	0	206	0	761	208	206	0	212	0	0	0
6 Solenoidea	488	674	846	825	1219	1882	880	803	933	1886	708	0
7 Euodiceae	0	0	0	0	0	376	0	0	0	185	3376	374
8 Naviculaceae	1760	1868	1540	1878	761	1017	1599	1685	1581	435	913	51
9 Fragilariaceae	1636	998	1289	964	679	1680	1322	923	1269	1380	1255	6227
10 Dinophysiales	197	0	188	0	0	0	226	0	226	172	0	124
11 Peridinales	587	1195	1136	1288	1445	2689	1203	1250	1122	1817	1547	309
12 Blue green algae	749	0	354	0	1736	3824	376	0	336	754	417	0

Table 3: Zooplankton distribution of Parangipettai coastal waters during the period Dec, 2005 to Nov 2006

Zooplankton (Nos/m ³)	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1 Foraminifera	4080	4759	2139	1715	2170	2468	2334	1500	2518	7709	4950	2200
2 Calanoida	4639	5067	4741	8149	9358	5916	5048	7588	4780	7100	9470	3412
3 Harpacticoida	2187	1133	358	1190	182	1004	405	1158	392	1266	2407	1217
4 Cyclopoida	2872	2948	4115	3415	3670	2472	4575	3557	4371	3754	5040	2200
5 Appendicularia	0	246	0	0	315	110	0	0	0	517	158	0
6 Decapoda	155	119	324	337	0	0	354	328	268	53	107	0
7 Sagittoida	0	223	379	210	113	339	307	132	349	0	132	295
8 Coelenterata	0	0	0	0	0	0	0	0	0	753	0	0
9 Pteropoda	0	0	281	0	0	0	354	0	243	0	0	0
10 Cladocera	0	0	0	0	0	0	0	0	0	0	0	159
11 Larval forms	5014	4517	6322	6261	5589	5581	6560	6316	6403	5012	12073	2602

and juveniles were collected during the months of December 2005 to November, 2006. The fishes were regularly collected from Annankoil landing center, Mudasalodai landing center and Pazhayar landing centre (Table 1).

Plankton Bio Volume: Phyto and zooplankton have also collected for the above period (Table 2&3). During June 2006, the zooplankton bio volume was higher and lesser in November were observed. However, Feb to May eggs are abundant and larvae are higher in October to December.

Total Abundance: In the Ichthyoplankton samples were ranged from 48 to 247 10m³ In the November and December eggs and larval density ranged from 28 to 128 10m³ Family wise larval density: During the year Dec. 2005 to Nov.2006, the representative of the family Sciaenidae eggs are dominate in the March to July but the larvae more dominant June and July (Fig.1). In Theraponidae the eggs were higher in March to Sep. but larvae were lesser in Oct to Feb (Fig.2) Pomadasidae, the eggs were higher in July and August. But larvae were lesser in Oct to Jan (Fig. 3) Holocentridae the eggs were higher in March to August but larvae were lesser in Oct to April. (Fig. 4) Species composition: A total of 1102 eggs and 265 larvae were collected, sorted and identified during this study.

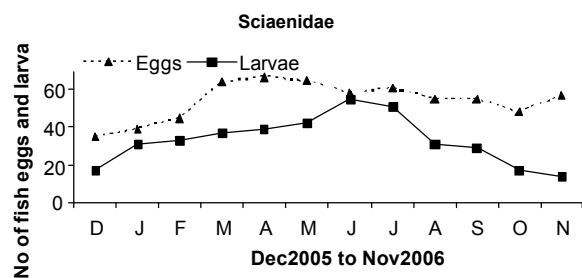


Fig. 1: Monthly collection eggs and larvae of family Sciaenidae

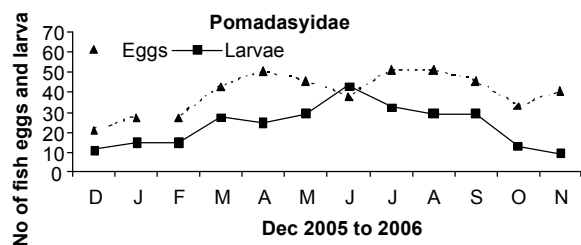


Fig. 2: Monthly collection eggs and larvae of family Pomadasidae

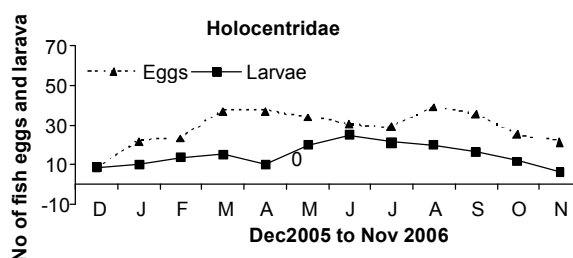


Fig. 3: Monthly collection eggs and larvae of family Holocentridae

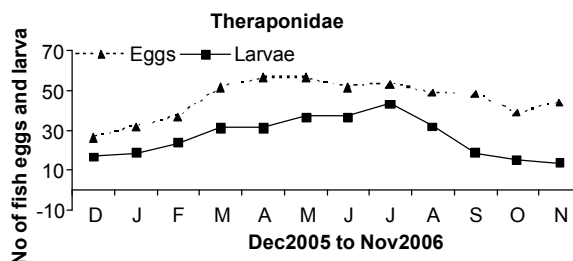


Fig. 4: Monthly collection eggs and larvae of family Theraponidae

The list of taxa compiled in the present study including 14 species of Sciaenidae, 8 species of Pomadasidae, 7 Species of Holocentridae and 3 species of Theraponidae and their eggs and larvae were identified (Fig. 5).

Description of Larvae

Sciaenidae -Post-larvae of 15.0 - 17.0mm size: Post larvae of *D. axillaries* have comparatively large head and slender tail. The mouth opening is slightly oblique and there are minute teeth on both the jaws the preopercle has a single close set row of 5 spines of which the one in the middle is slightly longer. The dorsal fin is deeply notched before the soft portion and is composed of 11 spines and 28 rays the anal carries 2 spines and 7 to 8 rays.

Juveniles of 20.0 - 26.0mm size: All the fins are well developed with the full complement of spines and rays there is no remarkable change except for the size and pigmentation.

Holocentridae: Among Beryciform fishes, the holocentrids are unique in that the adults reside in shallow waters, most typically on reefs. Their larvae are unique among marine fish larvae in developing greatly enlarged rostral, supraoccipital, preopercular and opercular spines Distinction between the two subfamilies of Holocentrids is straightforward rostral

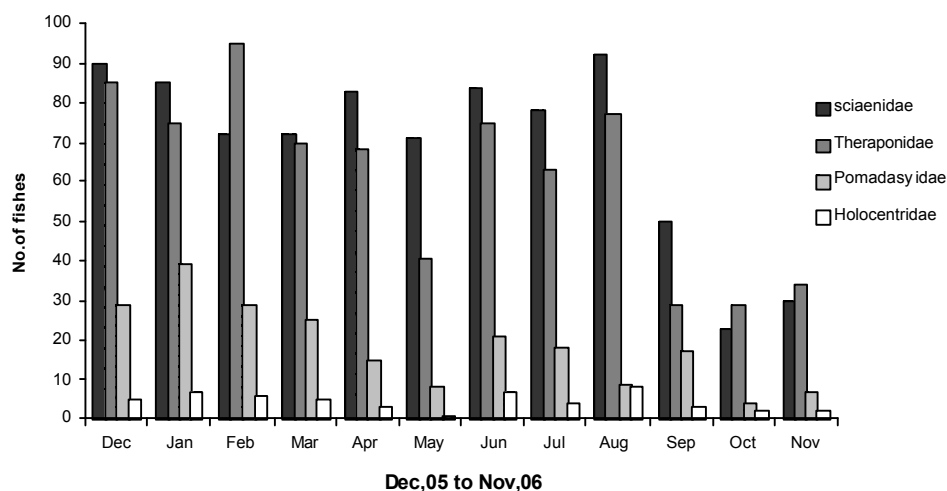


Fig. 5: Monthly survey of sound producing fish families recorded during the period Dec, 2005 – Nov, 2006

spine. The larvae of the Holocentrinae (squirrelfishes) exhibit late forming pelvics and have a very long, single rostral spine. Larvae of the subfamily Myripristinae (soldierfishes), however, form pelvic fins early in development and have a short bifurcate rostral spine.

Pomadasysidae: The specimen obtained can be referred to as *Pomadasys hasta* by the presence of 4-5 longitudinal rows of dusky spots on the body and black spots in the dorsal fin, whereas in *P. maculatus* there are 4-5 incomplete blackish cross-bands which are often broken in to large rounded blotches, the one present on the nape being prominent and spinous dorsal with a large black blotch. In *P. argyreus* the markings are absent; the young ones of this larvae a characteristic steel-blue. Blotch on the operculum. Theraponidae The length of post larvae ranging from 1.7 to 14.0 mm. The opercle is provided with about six spines of which the dorsal one is the longest and the strongest. The single dorsal fin has eleven slender spines and ten rays. The pectoral fin has fifteen rays. The anal fin is composed of nine rays. The caudal fin has about seventeen rays.

DISCUSSION

Information on fish eggs and larvae are very useful in fisheries biology regarding to reproductive period. On the basis of the occurrence of eggs and larvae of a particular species, it is possible to determine the probable spawning time of the species. The abundance of eggs and larvae provides fair indication on the fishery. Recorded the eggs of 18 species and larvae of 28 species, including the species *Pomadasys*, *Johnius*, *Sciaena* and *Therapon*,

which reported in the present study also [19]. The fish eggs of Portonovo coastal waters which included 8 species, viz., *Anodontostoma chacunda*, *Sardinella sp.*, *Opisthopterus tardoore*, *Saurida tumbil*, *Cynoglossus sp.* Carangids and *Arothron sp* [1]. But none of them was not recorded in the earlier studies. A total 32 species comprised of 14 species of Sciaenidae, 7 species of Holocentridae, 8 species of Pomadasysidae and 3 species of Theraponidae of sound producing marine fishes are recorded in the present work.

Post larvae of *Sciaena sp.* and *Johnius sp* [5] ranging from 13.6 to 19.2 mm were collected during November. Post larvae and juveniles of *Therapon sp.* length ranging from 1.7 to 14.0 mm were also recorded. The Jew-fishes (Sciaenids) are represented by many species along the Indian Coast of which, few are common on the Madras coast. The post larval forms are very common along the Madras coast during July to September [22]. Observed that the breeding of marine fishes intensified in December – January immediately succeeding the outbreak of the north-east monsoon [23]. In the present investigation, November to February is the period of spawning. Presumed that the post – larval stages might arrived from the spawning grounds situated elsewhere to the inshore waters of the west coast, which seems to form a nursery [5]. From November onwards a north-east monsoon drift sweeps up the coast of Ceylon and the west of India forming a strong coastal current in a northerly direction was seen similar to east coast also prevailed such current (Sony current) in the month of July and August [24]. The effect and pattern of prevailing current is one of the important factors that facilitate the distribution of larvae is the significant findings here. Since the fish larvae are

capable of free swimming, to some extent they can resist water movements but not with strong currents [25]. Post larvae juveniles of *Therapon* sp, [22] of length ranging from 1.7 to 14.0 mm were observed. The present record also showed the similar sizes. The eggs and larvae abundance is also determined by the environmental features and plankton predators, was also observed by earlier workers [26, 27] Based on this observation it is possible to draw certain conclusions about the migratory movements and breeding habits of sound producing fishes of the Parangipettai coast is according to the season, current pattern and availability of plankton.

Further, most of the fishes showed intense breeding activity only during the cold season. The presence of large number of fish eggs and larvae in the collections were made during the study period agreed with the earlier reports by John [28] and Nair [22] from Madras coast. Venkataramanujam and Ramamoorthy [19] and Sundarmanickam [17] were also studied the eggs and larvae composition from Parangipettai coast but their species compositions are different from the earlier reports.

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