STUDIES ON THE FRESH SETTLEMENT OF MEROPLANKTON
IN A TROPICAL ESTUARY, MANGALORE*

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ABSTRACT

Observations on the fresh settlement of meroplankton on natural substrata—granite stones and concrete pillars were carried out for a period of 12 months. Distinct variations in hydrographical parameters are correlated with settlement of different foulers. The intensity and frequency of settlement of three major fouling communities (cirripedes, bivalves and polychaetes) has been explained. Cirripedes formed the major settler community during post and premonsoon seasons in the estuary. Polychaetes were the least dominant and were found to be present only during premonsoon season.

INTRODUCTION

A great deal of work has been carried out on various aspects of fouling, in different parts of the world (Woods Hole Oceanographic Institution, 1952). The accent of these is mainly centred on experimental panels of glass, wood, fibreglass, etc. under constant observation. The present work attempts to work out the fresh settlement of meroplankton on some natural substrata such as granite stone walls and concrete pillars supporting the fish landing jetty along the Netravati-Gurupur estuary, Mangalore. It formed a Part A of the study “On the distribution of meroplanktonic larvae with reference to hydrography of Netravati-Gurupur estuary”. Since a major fraction of meroplankton is composed of larvae of sedentary organisms, it was thought that such a study will give the settlement pattern and the frequency and density of settler community in given time and space. More emphasis has been given to get an insight with regard to the settling intensity of the commonly occurring groups of sessile benthic organisms available at the lowest margin of intertidal region. Paul (1942), Daniel (1954) and Antony Raja (1959) have studied the settlement of sedentary organisms in Madras harbour. Detailed information on fouling communities from the west coast of India is available from the works of Nair (1967), Menon and Nair (1971), Menon, Katti and Shetty (1977) and Karande (1967). Rao (1976) in his work on the biology of marine fouling in Mangalore

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Fig. 1 Location Map.

Fig. 2 (a).

Fig. 2 (b).

Fig. 2 (c).

Fig. 2a, b, c. Variations in salinity, temperature, pH and dissolved oxygen.
waters, has dealt with the settlement of fouling organisms in two different environments (marine and estuarine). He has compared the seasonal settlement of fouling organisms on three artificial substrata-glass, glass reinforced plastic and teak.

MATERIAL AND METHODS

Three sites, one each for the three different sections of the estuary were selected, viz. Federation Ice Factory jetty (Nethravati river), Technology Wing jetty of College of Fisheries (confluence of two rivers) and Bunder jetty (Gurupur river) (Fig. 1). The Federation and Bunder jetty sites had the granite stone walls bordering the side of the estuary, while the College of Fisheries (Technology Wing) jetty had the concrete pillars. To ensure a complete coverage of water over the selected site at all the tidal periods, the areas were selected at lowest low tide period. At all the three stations an area of 0.0625 m$^2$ was scrapped completely of all the sedentary organisms during the early part of the investigation (March, 1978). The sedentary organisms freshly settled on these sites were collected once a month and preserved in 4% formalin. Water samples were collected for the estimation of salinity and dissolved oxygen. Temperature and pH of the water were also recorded at the site. Samples were analysed for quality and quantity and each group is expressed in No./m$^2$. No sampling was possible during the months from June to October as the selected substrates were completely submerged by the flood waters received during monsoon months.

RESULTS AND DISCUSSION

The variations in temperature, pH, dissolved oxygen and salinity at the three collection sites are shown in Fig. 2. Wide fluctuations noticed in the different para-

Table I. Fresh settlement of meroplankton: Major groups of sedentary organisms (No./m$^2$) in Nethravati—Gurupur estuary, estuary, Mangalore.

<table>
<thead>
<tr>
<th>Station</th>
<th>Period Groups</th>
<th>1978*</th>
<th>1979</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>April</td>
<td>May</td>
</tr>
<tr>
<td>Federation Jetty</td>
<td>Cirripedes</td>
<td>128</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Balan us sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bivalves</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crassostrea sp.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Polychaetes</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>College of Fisheries</td>
<td>Balan us sp.</td>
<td>16</td>
<td>128</td>
</tr>
<tr>
<td>(Technology Wing) jetty</td>
<td>Crassostrea sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polychaetes</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td>Bunder jetty</td>
<td>Balan us sp.</td>
<td>64</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Crassostrea sp.</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Polychaetes</td>
<td>48</td>
<td>132</td>
</tr>
</tbody>
</table>

* June to October—No data.
meters, closely followed the seasonal variations observed at other localities of the estuary (Rao, 1976; Menon, Katti and Shetty, 1977; Bhat, 1979; Gupta, Menon, Katti and Kurian, 1980). Higher temperatures, pH and salinity were recorded during the premonsoon months and a corresponding reduction and moderate increases during the succeeding monsoon and postmonsoon periods respectively. A clear inverse relationship existed between dissolved oxygen and salinity.

The distribution of the important forms of freshly settling sedentary organisms on the natural substrata at the three stations is presented in Table I. A perusal of the data shows that the cirripedes belonging to the genus Balanus were present in all the stations in larger quantities than the other groups. It is seen that fresh settlement commences near about November-December period and reaches a peak during January-February and thereafter reduces. During most part of November, the substrata were covered by the thin layer of primary film. Maximum settlement of barnacles was noticed at the confluence of the two rivers (19072 and 18152/m², January and February respectively). Rao (1976) and Menon, Katti and Shetty (1977) observed peak settlement of barnacles at a station in the Nethravati estuary during the months of November-December and secondary peak during April-May. Conspicuous absence of settlement of barnacles during the periods of extreme low salinities also have been reported by these authors.

Bivalves were represented by Crassostrea spp. and their settlement was restricted to a short period of three months, excepting at the Bunder jetty which had sparse settlement during April. Nair (1957) reported peak settlement at Cochin during April. Menon, Katti and Shetty (1977) observed continuous settlement in Mangalore harbour and a restricted settlement from November to June at the fish landing jetty located in the Mangalore estuary.

Polychaete settlement was the least in terms of density and duration. They were noticed only during April and May. A general dearth of polychaetes was noticed during other periods. From the available data it is rather difficult to ascribe reasons for such a phenomena, for the polychaete larvae are encountered during the periods after monsoon (Bhat and Gupta, 1980).

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