

OBSERVATIONS ON THE OCCURRENCE OF PENAEID POSTLARVAE IN KORAPUZHA ESTUARY

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ABSTRACT

The pattern of postlarval occurrence studied during 1973-75 in Korapuzha estuary near Calicut indicated that *M. dobsoni* and *P. indicus* are more or less continuous breeders, whereas, the spawning of *M. monoceros* seems to take place mainly in the summer months. *M. dobsoni* has spawning peaks during the monsoon and post-monsoon period whereas the principal peak for *P. indicus* is in summer or pre-monsoon months. It has been observed that *P. indicus* and *M. monoceros* occurred mainly in the periods of high saline conditions while *M. dobsoni* showed a tendency to occur more during the period when the water was less saline.

INTRODUCTION

It is well known that penaeid prawns spend their juvenile stages in the relatively low saline environment of estuaries and backwaters, the recruitment beginning early in the postlarval stages. The seasonal abundance of penaeid postlarvae, besides revealing the breeding pattern of the species (Rao 1968), serves as an index to predict the fishery (George 1963, Mohamed et al 1968 Subramanyam and Rao 1968). Further a knowledge on the resources of the postlarvae is essential to plan the prawn culture programme. Although an average of 984 metric tonnes of penaeid prawns are landed annually at Calicut, no information is available on the occurrence of postlarvae in the estuarine regions. Hence the present study was undertaken to assess the abundance of the postlarval forms of the species in the estuary during 1973-75.

MATERIAL AND METHODS

The Korapuzha estuary from where the sampling was done is situated about 10 kilometres north of Calicut. The topography of the estuary has been described by Suryanarayana Rao and George (1959). Weekly samples of postlarvae were collected by a net fabricated for the purpose (Fig. 1). This device consisted of a rectangular copper frame and a net portion which was formed of mosquito net and organdie cloth. The net was dragged by hand for six minutes in depth of water less than one metre between two fixed points, 120 metres apart

along the shore-line. The temperature of the sampling area was recorded with a centigrade thermometer. Salinity of the water was estimated in the laboratory by Mohr's method.

Samples were preserved in 5% formalin and later analysed in the laboratory. Generally the collections contained fish larvae, young annelids, molluscs and several crustaceans. The penaeid postlarvae were separated, identified, counted and then measured to the nearest millimeter. Length was measured from the tip of the rostrum to the tip of the telson. Identity and stages of postlarvae were determined according to the methods given by Rao (1968, 1973), Rao and Gopalakrishnan (1968) and Mohamed et al (1968). Stages of postlarvae were however recorded only for a period of one year (1974-75).

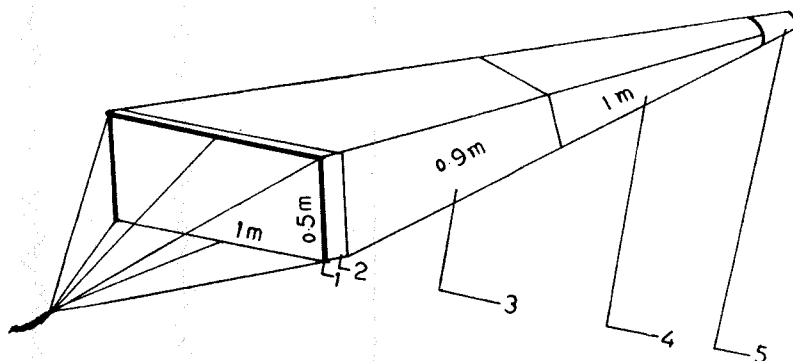


FIG. 1. Net used for postlarval collection.

1 — Copper frame, 2 — Khakhi cloth, 3 — Mosquito net material, 4 — Organdie cloth, 5 — Plankton bucket.

RESULTS

The monthly average of temperature and salinity of the estuarine water is represented in Fig. 2. Temperature exhibited a double oscillation, the higher values being noted in April-May before the monsoon (30.5° - 32.4° C) and again in November-December after the monsoon (29° - 32° C). The lower mean values of temperature were recorded in September and January and were below 26.5° C and around 28° C respectively. The influence of monsoon on salinity variations was also quite prominent. Salinity in general was high during summer ranging between 30 ‰ to 35 ‰. It was unusually high in March 1974 when the average was 38.4‰. During the monsoon period a sudden fall was noted in salinity, the average declining to less than 5‰.

Postlarvae of three important species of penaeid prawns, *M. dobsoni* (Miers), *M. monoceros* (Fabricius) and *P. indicus* (H.M. Edwards) were caught

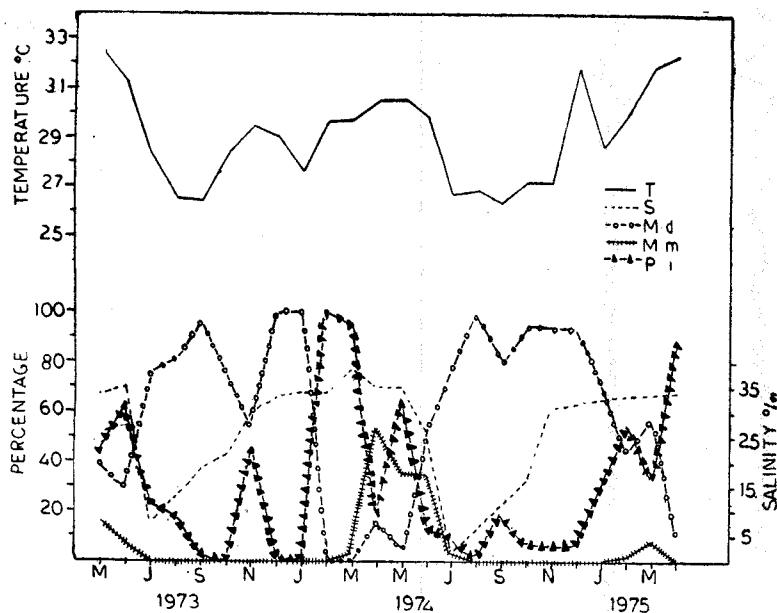


FIG. 2. Monthly distribution of temperature, salinity and percentage composition of post-larval recruitment at Korapuzha estuary during the period May 1973 to April 1975. T — temperature, S — salinity, M.d — *M. dobsoni*, M.m — *M. monoceros*, P.i — *P. indicus*.

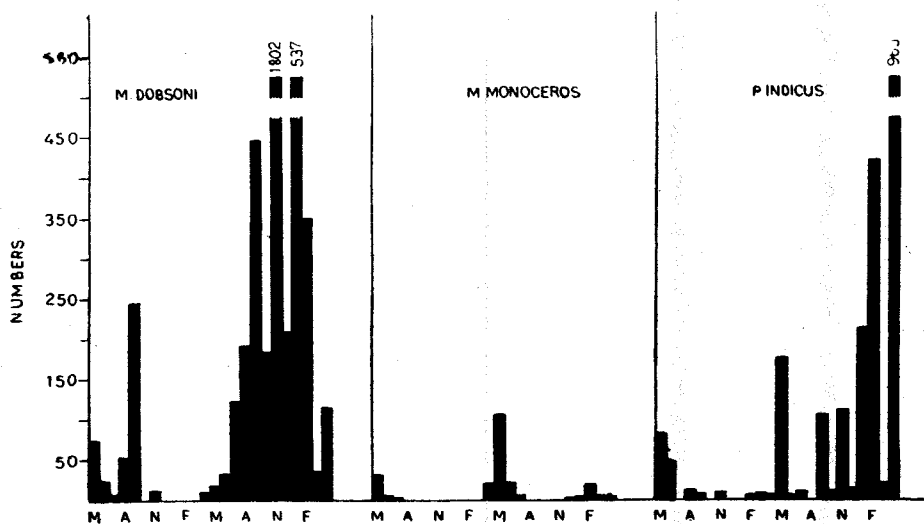


FIG. 3. Monthly average recruitment of postlarval of three penaeid prawns at Korapuzha estuary during the period May 1973 to April 1975.

in the estuary, but their relative abundance varied from season to season (Fig. 2 & 3). During the less saline months of July and September more than 75 % of the total recruitment of postlarvae were *M. dobsoni*. Percentage of *P. indicus* was maximum in premonsoon period when the salinity was normally high. In the case of *M. monoceros* postlarval incursion was rather poor and their entry was generally limited to the pre-monsoon period.

Metapenaeus dobsoni

Postlarvae of this prawn occurred almost throughout the year. During 1973-74 their abundance was for a brief period and was noted during August and September. During 1974-75 recruitment was continuous with several peaks occurring between September and February (Fig. 3). Throughout the period the dominating stages were IV and V (9-15 mm) except in February when they belonged to stage VI and VII (Table 1).

Metapenaeus monoceros

The occurrence of postlarvae was noticed generally from January to June. Recruitment was rather poor during 1973-74 (Fig. 3). During the second year the peak period of incursion was in May, the dominating stage being III (5 mm). Stage X (above 12 mm) also occurred in considerable numbers during February (Table 2).

Penaeus indicus

Postlarval recruitment appeared to be generally poor during 1973-74. However more numbers were encountered during May-June (Fig. 3). During 1974-75 the periods of abundance were in May, February and April with moderate incursion in September, November and January. Postlarvae in stages III and IV (8-10 mm) were dominant (Table 3).

REMARKS

The pattern of recruitment of postlarvae indicates that *M. dobsoni* and *P. indicus* are more or less continuous breeders. However, the former species has spawning peaks during the monsoon and post-monsoon period in September and November respectively, whereas, *P. indicus* has the principal peak during the pre-monsoon months between February and May with auxiliary peaks during September and November. As reflected in the postlarval occurrence, spawning of *M. monoceros* appears to be restricted mainly from January to June in the waters off Calicut. The period of abundance of postlarvae in the estuaries corresponds approximately to the peak period of breeding of the species recorded by earlier workers (George 1962, Subramanyam and Rao, 1968 and Rao 1972).

The seasonal distribution of *M. dobsoni* is observed to be entirely different from that of *M. monoceros* whereas *P. indicus* has the characteristics of both

TABLE 1. Incidence of various substages of postlarvae of *M. dobsoni* at Korapuzha estuary during the period May 1974-April 1975.

Months:		May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
No. of collections		4	3	5	4	4	5	4	9	7	6	7	8	66
Sub-stage	Length in mm.													
I	3-4	—	—	—	—	—	—	—	—	—	—	—	8	8
II	5	—	—	3	—	8	19	—	—	12	—	—	—	42
III	6-8	—	12	126	181	550	118	902	19	287	42	45	176	2458
IV	9-11	19	33	232	297	759	379	2385	282	1186	290	84	465	6411
V	12-15	21	38	143	187	256	302	1297	553	1616	356	86	227	5082
VI	16-18	14	9	50	60	102	76	1495	681	331	567	27	35	3447
VII	Above 18	16	4	57	43	114	31	1129	357	327	852	4	4	2938
Total		70	96	611	768	1789	925	7208	1892	3759	2107	246	915	20386

TABLE 2. *Incidence of various substages of postlarvae of M. monoceros at Korapuzha estuary during the period May 1974-April 1975.*

Months:		May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
No. of collections		4	3	5	4	4	5	4	9	7	6	7	8	66
Sub-stage	Length in mm													
I	3.5	—	—	—	—	—	—	—	—	—	—	—	—	—
II	4	—	—	—	—	—	—	—	—	—	—	—	—	—
III	5	400	—	—	—	—	—	—	—	—	—	—	—	400
IV	6	—	—	—	—	—	—	—	—	—	—	—	—	—
V	7	2	—	—	—	—	—	—	—	—	—	—	—	2
VI	8	4	5	—	—	—	—	—	2	—	6	—	4	21
VII	9	1	4	—	—	—	—	—	—	—	—	10	—	15
VIII	10	7	3	—	—	—	—	—	—	—	26	4	—	40
IX	11-12	4	5	—	—	—	1	—	—	—	24	2	13	49
X	Above 12	7	45	26	—	—	—	—	6	21	61	16	8	190
Total		425	62	26	—	—	1	—	8	21	117	32	25	717

TABLE 3. *Incidence of various substages of postlarvae of P. indicus at Korapuzha estuary during the period May 1974-April 1975.*

Months:		May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
No. of collections		4	3	5	4	4	5	4	9	7	6	7	8	66
Sub-stage	Length in mm													
I	5	25	—	—	—	—	—	—	—	—	—	—	—	25
II	6-7	209	—	—	—	5	2	33	10	54	15	—	2	330
III	8	167	4	20	—	37	8	47	55	307	293	8	97	1043
IV	9-10	407	13	39	—	153	40	131	59	653	1355	107	3627	6584
V	11	5	1	—	—	16	2	63	5	125	379	19	799	1414
VI	12-13	55	—	—	—	66	2	93	—	48	340	4	380	1488
VII	14	—	—	—	—	6	1	39	—	113	53	—	445	657
VIII	Above 14	14	3	—	—	147	—	45	1	233	100	—	1854	2397
Total		882	21	59	—	430	55	451	130	1533	2535	138	7704	13938

the species. Differences in the pattern of migration of the adults of these species have been noticed off Cochin (George et al 1968). The characteristic seasonal occurrence of the postlarvae of the various species of prawns in the Korapuzha estuary is suggestive of a similar phenomenon in the waters off Calicut.

Wide annual fluctuations in the postlarval recruitment of different species of prawns were noticed, the recruitment during 1974-75 being better. It was interesting to note that salinity was comparatively low during this year. Temperature does not appear to have any relation to the postlarval incursion. However a study on aspects relating to the spawning success and prevailing currents would be necessary to understand the occurrence of such wide fluctuations in the postlarval recruitment in the estuary.

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