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LARVAL ABUNDANCE OF NON-PENAEID PRAWNS IN THE BOMBAY HARBOUR

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ABSTRACT

Abundance of non-penaeid prawn larvae was studied from the Bombay waters by collecting plankton samples from the harbour during the years 1981-82. Although the larvae of all the three species occurred throughout the year, *Nematopalaemon tenuipes* larvae were the most abundant showing greater abundance from September to November. *Exhippolysmata ensirostris* larvae also showed peak occurrence from September to November whereas *Acetes indicus*, in spite of its greater abundance in the fishery, did not show any remarkable peak of abundance. The peak breeding activity of *N. tenuipes* and *E. ensirostris* was found to be correlated with their peak larval abundance.

INTRODUCTION

THE OCCURRENCE and abundance of larvae give an indication of the breeding season of prawns. The occurrence of mature individuals in the same area where larvae are found would support, in addition, that their breeding, spawning and nursery grounds are the same. George (1964) studied the recruitment of post-larvae in the backwaters with a view to confirm the earlier observations on breeding season of different species of penaeid prawns. Our knowledge of maturation and spawning of non-penaeid prawns, which constitute about 50% of the total prawn landings (CMFRI, 1983) along the northwest coast of India, is entirely based on the data on incidence of mature prawns in the catches obtained in different months (Kunju, 1981 ; Sukumaran, 1979).

The present paper deals with the fluctuations as well as abundance of the non-penaeid prawn larvae and their correlation with maturation of the important non-penaeid prawns during different months of the year in the Bombay Harbour.

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MATERIAL AND METHODS

The zooplankton collections were made every fortnight for the years 1981 and '82 in the Bombay Harbour using a half-metre organdy net. The net was towed against the current for ten minutes duration during early morning from subsurface waters and the plankton samples were immediately preserved in 5% neutral formalin. The larvae of non-penaeid prawns were identified using larval characters described by Pillai (1966), Pillai (1973) and Pillai (1974). The larvae generally encountered are given in Fig. 1. For quantitative studies subsamples of plankton were taken using plankton divider and whenever the volume of plankton was small the entire sample was analysed. The two observations

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taken during the month were combined and averaged for each month. The plankton samples could not be collected during July-August 1981 and in July 1982 due to turbulant waters owing to rough weather conditions.

Of the total number of decapod larvae in all the months the non-penaeid prawns formed nearly 46%, the rest being larvae of other decapods of the families Alphidae, Penaeidae and brachyuran zoeae. The larvae of non-

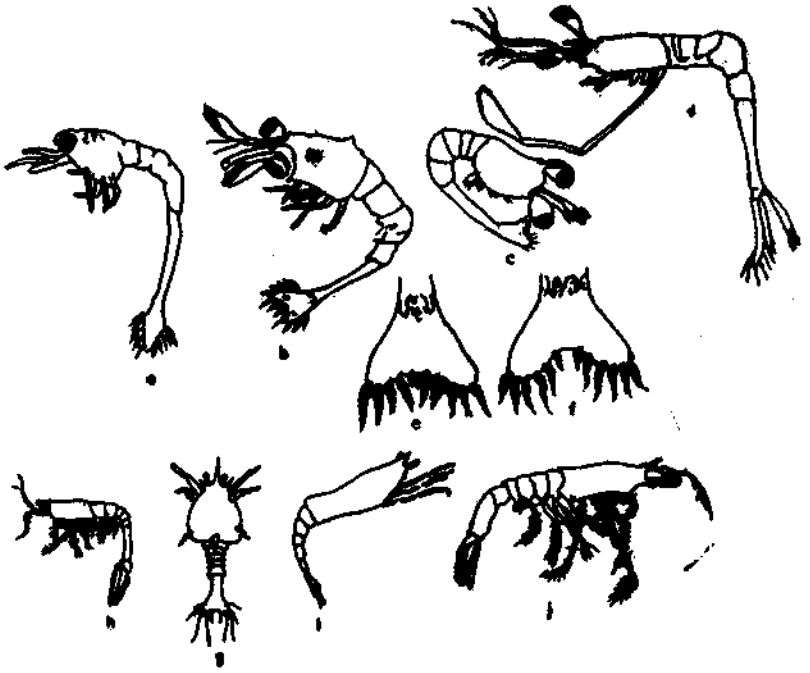

Fig. 1. Common larval forms of non-penaeid prawns in the Bombay Harbour. *N. tenuipes :* a. Zoea I and b. Zoea II ; *E. ensirostris :* c. Zoea II and d. Zoea III ; e, f. telsons of *N. tenuipes* and *E. ensirostris. Acetes indicus :* g. Protozoea III, i. mysis and h, j. Setose postlarvae.

Samples of non-penaeid prawns were collected from the commercial 'dol' nets operated in the harbour. The maturity stages for the caridean prawns *Nematopalaemon tenuipes* Henderson and *Exhippolysmata ensirostris* kemp, were determined as described by Kunju (1981) and Sukumaran (1979) respectively. For the sergestid shrimp *Acetes indicus* the method given by Rao (1967) for the penaeid prawns was used.

RESULTS

Total larval abundance

The total number of non-penaeid prawn larvae for the two years is given in Table 1.

TABLE 1. *Annual occurrence of non-penaeid prawn larvae*

	1981	1982	Average
N. tenuipes	558 (81.45%)	515 (62.88%)	537 (71.34%)
E. ensirostris	96 (14.01%)	144 (17.58%)	120 (15.96%)
A. indicus	31 (4.53%)	160 (19.54%)	95 (12.70%)
Total non-penaeid prawn larvae (% among decapods)	685 (49.28%)	819 (43.40%)	752 (45.88%)
Total Decapod larvae	1390	1887	1639

penaeid prawns, although belonging to diverse families such as Palaemonidae, Hippolytidae and Sergestidae, formed the single largest dominant group among the decapod larvae particularly during the Postmonsoon months from September to November in the Bombay Harbour creek (Fig. 2). The larval abundance of non-penaeid prawns was better in 1982 than in 1981 although they formed 49.3% of the total decapod larvae in 1981 and only 43.4% in 1982.

Larvae of N. tenuipes

Among the non-penaeid prawns *N. tenuipes* larvae were the most abundant constituting 81.46% in 1981 and 62.88% in 1982. Most of the larvae encountered in this study were zoae in I and II stage as described by Pillai (1966). The monthly distribution and abundance of larvae of this species are shown in Fig. 2a. In 1981, the abundance of larvae in January shows declining trend until May. From June the increasing trend is apparent,

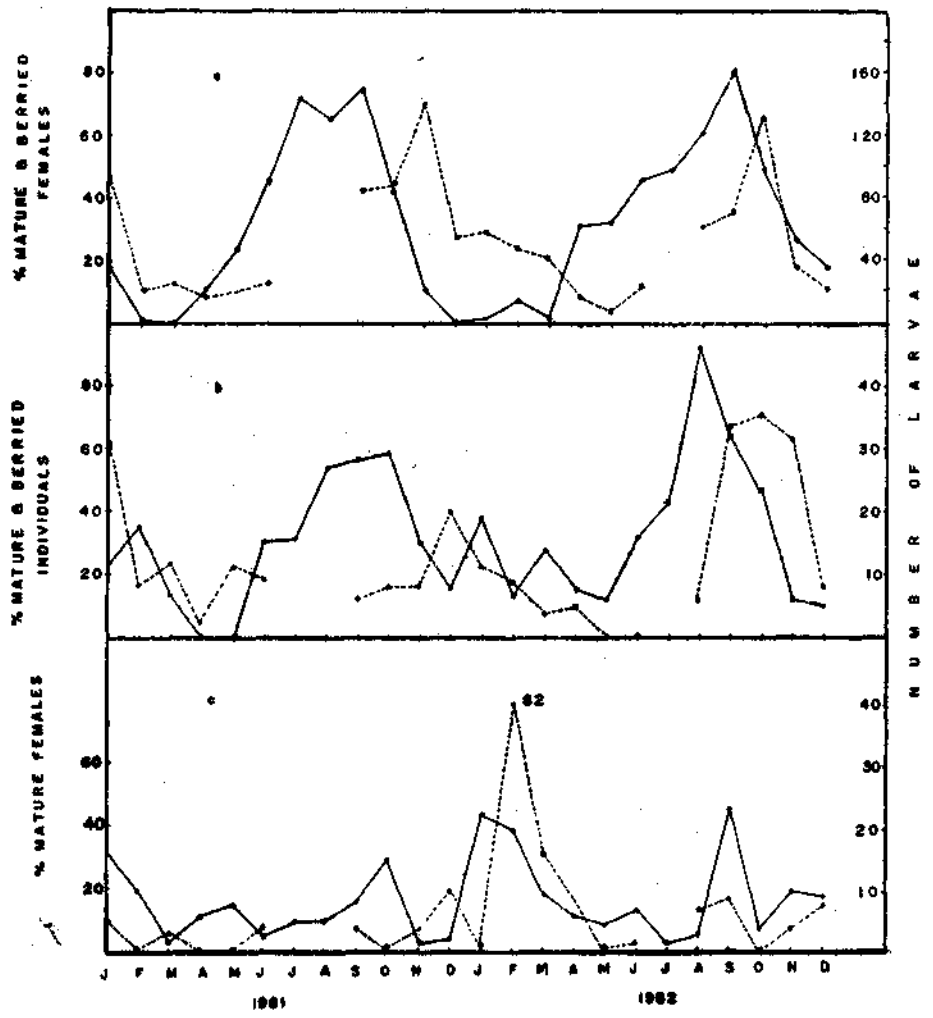

Fig. 2. Larval abundance in numbers and occurrence of matured and berried individuals in Bombay Harbour : a. *N. tenuipes* ; b. *E. ensirostris* and c. *A. indicus*.

but the peak is seen in November which goes on declining gradually from December to May, 1982. From June 1982 onwards again increasing trend is apparent which appears to have culminated in peak abundance in October, 1982. Thus *N. tenuipes* larvae occurred throughout the year with greater abundance from September to November.

The monthwise percentage occurrence of matured and berried females of *N. tenuipes* also shown in Fig. 2 a indicates that the matured and berried females occurred almost throughout the year except in February-March in 1981 and December-January in 1981-'82. They showed peak occurrence in July and September in 1981 and in September 1982 indicating peak breeding activity during monsoon months.

Larvae of E. ensirostris

Most of the larvae found during the present study were in early zoeal stages and could be distinguished from those of *N. tenuipes* by the presence of prominent rostral spine and pigmentation (Pillai, 1974). However, sometimes these characters were not clear due to preservation and therefore it was found that shape of the telson could be used to distinguish zoeae of these species. The telson of *E. ensirostris* showed a deeper median notch than that of *N. tenuipes* (Fig. 1). The advanced zoeae and post larval stages were however, easily identified by their extremely long 5th pair of pereiopods. But these were rarely found in the samples.

The larvae of *E. ensirostris* occurred almost throughout the year except in May, 1982. They formed 14.01% of the total non-penaeid prawn larvae in 1981 and 17.58% in 1982. Fig. 2 b shows that in 1981, minor peak of abundance were seen in March, May and December whereas in 1982 distinct peak period was observed during Setpember to November with the maximum in October.

The matured and berried individuals of this hermaphrodite prawn (Sukumaran, 1973, Kagwade, 1981) occurred (Fig. 2 b) throughout the year except in April-May,1981. They showed peak occurrence from August to October in 1981 with a minor peak in February. In 1982 the peak occurrence was in August, but they were present in relatively good numbers in Monsoon months from July to October 1982. Smaller peaks were also observed in January and March 1982.

Larvae of Acetes indicus

All the larval stages of *A. indicus* occurred in the plankton samples, but the postlarval stages were the most abundant and easily identifiable due to their peculiar 'setose' appearance. Sometimes adult *A. indicus* were also found in the samples due to their epiplanktonic nature. The larvae of this species were very poorly represented in 1981, being only 4.53% of the total non-penaeid prawn larvae in 1982 they formed 19.54%.

The larval abundance in 1981 showed only one appreciable peak in December, but in 1982, two clear peaks were seen — one in February and the other in December. The February peak however, comprised of only nauplii and protozoae I and II. Monthwise distribution of mature females given in Fig. 2 c showed peak occurrence in May and October 1981, and in January, June and September 1982.

Discussion

Kunju (1981) oberved that breeding activity of *N. tenuipes* is relatively much greater during the period July to October. The present observation is in accordance with it, but the secondary peak period of breeding found in March-April by Kunju (1981) was not noticed. The peak breeding period from June to October, observed during the present study is further supported by the greater larval abundance from August to October. The peak breeding

activity of *N. tenuipes* followed in 1-2 months by the peak larval abundance clearly suggests that maturation of ovary, incubation and hatching of eggs would be requiring 1-2 months only. Kunju (1981) also deduced from the laboratory reared larval studies carried by Pillai (1966), that the entire process of maturation, incubation and larval hatching may be accomplished within a period of about 40 days. Sheikhmohamud and Tembe (1960) considered that Leander (= *N. tenuipes*) was a temporary resident of fishing areas immigrating for the purpose of breeding. But the occurrence of adults, maturing individuals as well as larvae almost throughout the year in the harbour indicates that this species does not undergo conspicuous breeding migrations.

Kagwade (1984) studied spawning of *E. ensirostris* in Bombay waters and concluded that berried individuals of this species carry eggs for 2 or 3 months. But the present study indicates that peak occurrence of berried and matured individuals of *E. ensirostris* is followed by the peak abundance of larvae in about 2 months only. This may suggest that incubation and hatching of the eggs in *E. ensirostris* may be accomplished with about two months as the hatching of eggs into early 1-3 zoeal stages is completed within a short period of 2-3 days only (Bensam and Kartha, 1967; Pillai, 1974). Sukumaran (1979) as well as Sheikhmohamud and Tembe (1970) suggested that larger prawns of this species migrate into deeper waters for breeding purpose, but the present study shows that this may not be true as the matured and berried individuals of all sizes as well as the different larval stages were found in the harbour almost throughout the year.

The landing of *A. indicus* in 1981 and 1982 was 735.8 tonnes and 1166.3 tonnes respectively. Comprising 73% and 86.8% of the total non-penaeid prawns. In spite of being the most dominant species in the Bombay Harbour fishing ground, the larval abundance as well as the percentage occurrence of mature females of this species was quite poor and no correlation between them is discernible from the 1981 data. The 1982 data however, apparently show some correlation where the peak occurrence of mature females is followed by the abundance of larvae. Nevertheless, the poor abundance of larvae which formed only 12.7% of the total non-penaeid prawn larvae during the two year period may suggest that *A. indicus* breeds in shallower areas of the creek. Omori (1975) also thanks that spawning of *Acetes* may be in shallow neritic waters from where they are being avoided from transportation to the offshore waters.

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