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STUDIES ON THE PLANKTONIC DECAPODA AND STOMATOPODA
(CRUSTACEA) FROM THE WESTERN BAY OF BENGAL

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ABSTRACT

Abundance and distribution of decapods and stomatopods were studied, based on 90 samples collected from the western Bay of Bengal (Lat. $09^{\circ}58'$ and $20^{\circ}50'N$ and Long. $80^{\circ}00'E$) between 24 August and 2 October, 1976. The decapod larvae were present in 50 samples. The maximum abundance of these larvae (11,000 specimens) was found in shallow, coastal waters. As much as 19 species were obtained from a single sample collected from a shallow station between Pondicherry and Nagapatnam. The maximum number of larvae obtained was 2393/100 m³ in a single haul from a coastal station, north off Madras. The major forms obtained in the present collections were penaeids, sergestids, carideans, thalassinids, pagurids, crab zoeae and megalopae and Alima larvae. Their relative occurrence and abundance in the western Bay of Bengal and the Arabian Sea have been discussed.

Key-words: Decapoda, stomatopoda, Bay of Bengal.

INTRODUCTION

Information on the qualitative and quantitative aspects of decapod larvae especially on the planktonic forms from the Bay of Bengal has been scanty. Menon (1933, 1937 and 1940); Menon and Paulinose (1973) and Alikunhi (1949) did some work on the decapod larvae from Madras coast. Nair, Peter and Paulinose (1977) made a preliminary study of the zooplankton from the Bay of Bengal during the southwest monsoon and made a quantitative assessment of the decapod larvae. The qualitative and quantitative nature of the zooplankton helps to find out the fishery of a particular species and also gives a clue on their breeding periods and spawning seasons. The present communication gives a detailed account of qualitative and quantitative aspects of planktonic Decapoda and Stomatopoda from the western Bay of Bengal.

MATERIAL AND METHODS

Vertical zooplankton samples were collected from the east coast of India (Cr. VII) during the cruises of RV Gayeshani (Cr. VII to IX, 24 August

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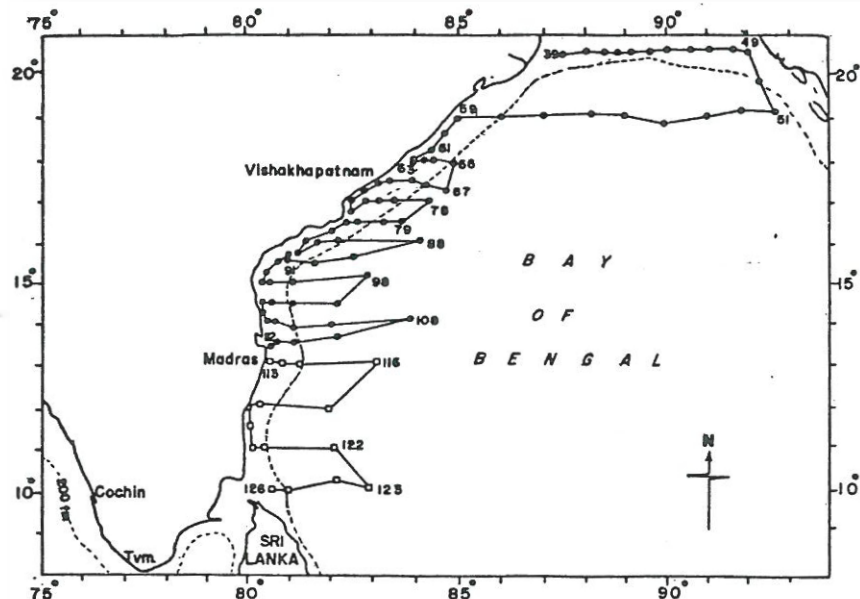


Fig.1. Station and cruise tracks of RV Gaveshani (Cruises VII-IX) in the Bay of Bengal.

to 2 October, 1976) using an Indian Ocean Standard Net (Currie, 1963). During cruise VIII, a HT net was also used at a few stations in addition to the IOSN. In shallow stations, the entire water column was sampled while in some deep stations, samples were collected from 200-0 m and 500-0 m. From a few stations, where a well defined thermocline was observed, two samples were taken, one above and one below the thermocline.

Decapod larvae were sorted out from the 90 zooplankton samples. The specimens were identified mostly upto family or genus level and given as number/100 m³. Distribution of major groups is shown in Figs.2 to 4.

CLASSIFIED LIST

Macrura:
 Natantia:
 Penaeidea
 Family: Penaeidae
 Subfamily: Solenocerinae
 Genus: Solenocera (10)
 Subfamily: Aristaeinae
 Genera: *Aristeus* (84)
 Aristaeomorpha (2)

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Subfamily: Penaeinae
 Species: *Penaeus indicus* (174)
 Penaeus semisulcatus (1)
 Metapenaeus dobsoni (293)
 Metapenaeus monoceros (14)
 Metapenaeus affinis (60)
 Parapenaeopsis stylifera (5)
 Penaeopsis rectacuta (132)
 Metapenaeopsis mogiensis (100)
 Parapenaeus investigatoris (22)
 Trachypenaeus curvirostris (10)
 Other species (351)

Family: Sergestidae
 Genera: *Acetes* (80)
 Sergestes (586)
 Species: *Lucifer typus* (1080)
 Lucifer hansenii (4274)

Caridea
 Families: Oplophoridae (63)
 Pasiphaeidae (429)
 Palaemonidae (642)
 Alpheidae (537)
 Hippolytidae (23)
 Processidae (482)
 Pandalidae (373)
 Crangonidae (5)

Reptantia
 Thalassinidae:
 Family: Axiidae
 Genus: *Axius* (62)
 Family: Callinassidae
 Genus: *Callinassa* (31)
 Family: Upogebiidae
 Genus: *Upogebia* (16)
 Anomura
 Galatheiidea
 Family: Galatheidae
 Genus: *Galathea* (30)
 Family: Porcellanidae
 Genus: *Porcellana* (42)
 Paguridea
 Family: Paguridae
 Genera: *Pagurus* and *Diogenes* (272)
 Hippidea
 Family: Hippidae
 Genera: *Hippa* (1)
 Albunea (67)
 Brachyura: Crab zoea (531)
 Crab megalopa (188)
 Stomatopoda:
 Genus: *Squilla* (380)

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RESULTS AND DISCUSSION

Out of total 90 samples examined, 50 contained larvae of planktonic Decapoda and Stomatopoda. The larval occurrence was not very abundant at all the stations. However, the areas of abundance were the shallow coastal waters off Madras; south of Kakinada and northeast off Visakhapatnam. During the present study more than 35 forms of decapod larvae were identified. The larvae are included under the following major groups: Penaeidea, Caridea, Bachyura, Anomura, Thalassinidea and Stomatopoda (Fig.4). A detailed account of each family and its abundance is given below:

Penaeidae: 28 samples contained larvae of the family Penaeidae. The super-family Penaeidea comprises two families, the Penaeidae and Sergestidae. The former includes 4 sub-families namely, Solenocerinae, Aristaeinae, Penaeinae and Sicyoninae. Members of the first 3 sub-families were present in the collections.

The larvae of Solenocerinae belong to a single genus, *Solenocera* and those of Aristaeinae to two genera, *Aristeus* and *Aristaeomorpha*. The sub-family Penaeinae included some of the common species of commercially important penaeid prawns with 1162 specimens, which belong to more than ten species. The most important among the commercial species were: *Penaeus indicus* (174), *P. semisulcatus* (1), *Metapenaeus dobsoni* (293), *M. affinis* (60), *M. monoceros* (14) and *Parapenaeopsis stylifera* (5). Other species were *Penaeopsis rectacuta* (132), *Trachypenaeus curvirostris* (10) and *Metapenaeopsis mogiensis* (100).

The dominant species of penaeid prawns were *Metapenaeus dobsoni* and *Penaeus indicus*. Both are common in the Indian Ocean. The penaeid larvae were present in more than 20 samples. The number of larvae was less but they were widely distributed.

Sergestidae: Maximum number of decapod larvae (6475) was due to the presence of a single genus *Lucifer* which occurred in most of the samples (Fig.4). The two species present were *Lucifer typus* and *L. hanseni*. The next genus in abundance was *Sergestes* with 586 specimens. The genus *Acetes* was represented by 80 specimens. The species of the genera *Lucifer* and *Acetes* are typically epiplanktonic shrimps which often become a major component in the diets of shore fishes and large shrimps (Omori, 1974). The maximum number of specimens (2393) from a single haul was obtained from station 112, off Madras and the abundance was mainly due to the presence of *Lucifer*.

Caridea: The caridean larvae were present in 74 samples with 2554 specimens/100 m³. Among the caridean families the larvae of Palaemonidae

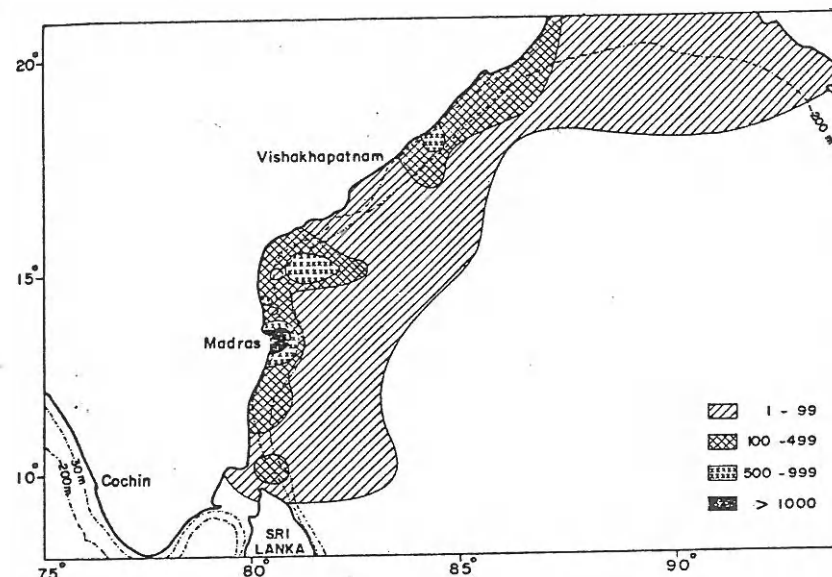


Fig.2. Distribution and abundance of decapod larvae in the Bay of Bengal.

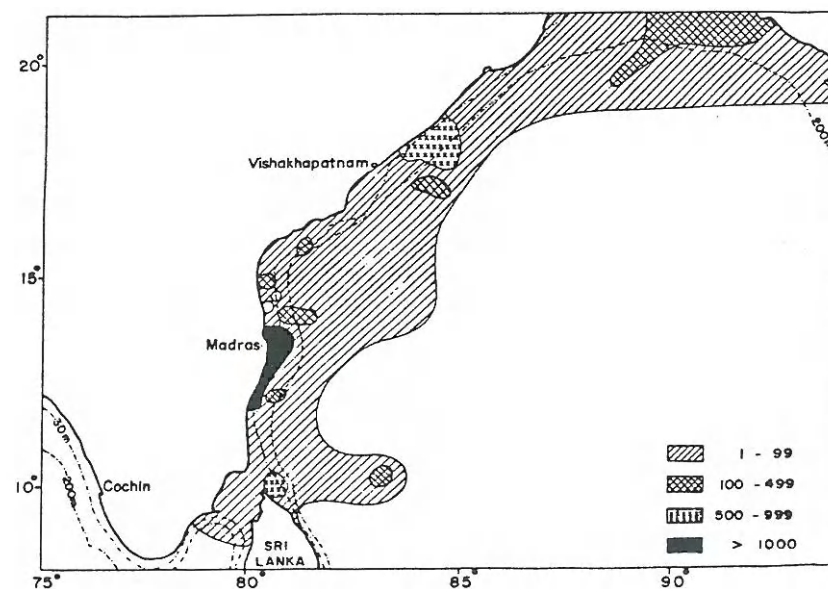


Fig.3. Distribution and abundance of Penaeid larvae in the Bay of Bengal.

(642) were dominant. The maximum number of caridean larvae (755) was obtained from a shallow coastal station 119. The palaemonids of economic importance belong to the common genera *Macrobrachium*, *Palaemon*, *Periclimenes* and *Leander* and there exists a good fishery in the Indian waters. The alpheid shrimps were common in the collections and ranked second in abundance among the carideans. The larvae mainly belong to *Alpheus*, *Athanas* and *Synalpheus*. The larvae of the family Pasiphaeidae was represented by *Leptochela* which is an important forage species of pelagic fishes. Processidae larvae (482) were present in the samples. The larvae of the deep water prawns of family Pandalidae like *Pandalus*, *Parapandalus* and *Thalassocaris* were also present. Members of the families Oplophoridae, Hippolytidae and Crangonidae were present in small numbers.

Thalassinidae: The thalassinids include the axiids, callianassids, laomedids and upogebiids as classified by Williamson (1969). They were present in 17 samples with an aggregation of 109 specimens. The axiids were dominant among the thalassinids and most of the larvae belong to the genus *Axius*. Members of callianassids and upogebiids were also present. The thalassinids have little commercial value.

Anomura: The anomurans include the families Galatheidae, Porcellanidae, Paguridae and Hippidae. The pagurids (273 specimens) dominated in the samples. The larvae of Albulidae, Porcellanidae, Galatheidae and Hippidae were present in small quantities.

Brachyura: The brachyurans were represented by crab zoeae (531) and megalopae (188) specimens. The crab larvae constituted the 3rd abundant group in the samples. At station 119, 133 zoeae were obtained. This was a shallow station with a depth of 40 m and with a maximum number of 19 species.

Stomatopoda: The stomatopoda was represented by the *Alima* larva of *Squilla*. A total number of 380 larvae were present in 12 samples. The maximum number of *Alima* larvae were obtained from station 97 (Fig.1).

According to Menon, Menon and Paulinose (1969) decapod larvae form an important constituent of zooplankton. But these animals seldom occur in large numbers, except for certain unusual swarms of species of *Lucifer* and *Acetes*. Menon and Paulinose (1973), based on a study of the decapod larvae from the 110E collections (1578 samples), found that the decapod larvae were more dominant in shallow coastal regions. Prasad (1969) and Panikkar and Jayaraman (1966) considered the Arabian Sea as more productive than the Bay of Bengal. But based on the zooplankton studies in relation to decapod larvae by Nair, Peter and Paulinose (1977) and the present study, it is inferred that the Bay of Bengal is equally rich in zooplankton production especially in areas like the Wadge Bank and off Madras in the south and off the coast of Visakhapatnam, Pondicherry and Orissa in the north.

A qualitative study of the planktonic Decapoda and Stomatopoda collected from the Bay of Bengal at station 119, showed a maximum number

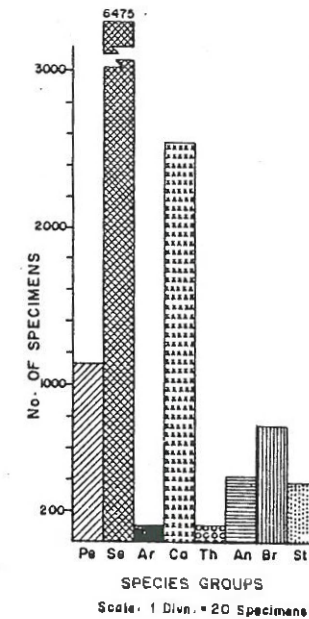


Fig.4. Group abundance in total collections: Pe:Penaeidae, Se: Sergestidae, Ar:Aristaeinae, Ca:Caridea, Th:Thalassinidae, An:Anomura, Br:Brachyura and St:Stomatopoda.

of species (19) including larvae of commercially important penaeid prawns. Station 126 was second in species abundance off the mouth of Palk Strait. It contained 13 species of planktonic decapods including larvae of commercial prawns. A number of species may be co-existing with maximum number of larvae. The samples from deeper waters (500-0 m) contained only very few larvae belonging to some of the deep water species of genera *Aristeus* and *Sergestes*. It was noticed that most of the earliest stages (nauplius and protozoeae) of penaeids and some of the other groups were not present in any appreciable quantities. However, it is interesting to note that the maximum number of larvae found in the samples belong to a single species, *Lucifer hanseni*. Many decapods have a spawning season in coincidence with zooplankton abundance. While the Bay of Bengal yielded 11,000 larvae from 40 samples, it was only 7,000 specimens in the Arabian Sea (Paulinose, Goswami and Nair, 1987). The number of species recorded in the present study at station 119 was even greater than that of the IICE samples (12) taken around the Minicoy and Maldive islands (Menon, Menon and Paulinose, 1969). Further, there are records of rich resources of decapod larvae in the Andaman Sea (Paulinose, 1973).

The percentage occurrence of the groups and species under classified list reveals that more than 65% of the larvae belong to Penaeidae. Among penaeids, sergestids dominated with 55% of the total decapod larvae. The non-penaeid carideans formed the second largest group with more than seven families. They constituted 21% of the total specimens. The next group in abundance was the brachyuran larvae including the crab zoeae and megalopae. They formed 6% of the total animals. The thalassinids and anomurans together formed 5% of the total number of larvae. The stomatopods were present in more than 10 samples and formed 3% of the total larvae.

From the present study of decapod larvae, it can be suggested that there is a good prawn fishery prospect in the Bay of Bengal region inspite of its restricted activities in fishing and partial exploitation of the fisheries. Panikkar and Rao (1973) remarked that in the Bay of Bengal the situation is quiet and calmer and therefore acts as a better nursery ground for most of the larval organisms. The present study is in agreement with their observation.

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