

## STUDIES ON PLANKTONIC DECAPODA AND STOMATOPODA (CRUSTACEA) FROM THE ARABIAN SEA

V. T. PAULINOSE, S. C. GOSWAMI\* AND VIJAYALAKSHMI R. NAIR\*\*  
*Regional Centre, National Institute of Oceanography, Cochin-682 018.*

### ABSTRACT

An account of a qualitative and quantitative analysis of the planktonic decapoda and stomatopoda collected during *R V Gageshani* Cruises 10, 12 13 in the Arabian Sea is given. Area surveyed lies between latitudes 07°00' and 20°00'N and longitudes 66°00' and 78°00'E and depths ranging from 25 to 500 m. Only 40 samples out of 93, contained planktonic decapods and stomatopods. Maximum number of larvae (1501/100 m<sup>3</sup>) was obtained from Station 228 (Ga. Cr. 13), a very shallow, coastal station, north off Cochin. The maximum number of species found was (11) collected from Station 219 in the same cruise, off Trivandrum. Large concentrations of larvae were also noted in and around the coasts off Saurashtra and Bombay. A total number of 7000 larvae/100 m<sup>3</sup> belonging to more than 30 species were obtained during these cruises. The larvae comprised mainly of the decapoda groups viz. Penaeidea, Caridea, Stenopidea, Thalassinidea, Anomura, Brachyura and Stomatopoda. Majority of the larvae (80%) belonged to the super-family Penaeidea.

*Key-words:* Decapoda, Stomatopoda, Arabian Sea.

### INTRODUCTION

Early studies on the planktonic decapoda were made by Menon and Williamson (1971), Menon (1972) and Rao (1973). Only a few have worked on the larvae of decapoda and stomatopoda from the Arabian Sea (George and Paulinose, 1973; Menon and Paulinose, 1973; Nair and Paulinose, 1980 and Paulinose, 1979 and 1982).

The present paper deals with the decapod and stomatopod larvae from the Arabian Sea and a special reference has been made to the distribution and abundance of the larvae of penaeid prawns of commercial importance. Except for the Sergestidae, other families had only very few specimens in the

---

Present address \* National Institute of Oceanography, Dona Paula, Goa-403 004.

\*\* Regional Centre, National Institute of Oceanography, Sea Shell Building,  
Seven Bungalows, Versova, Bombay-400 061.

samples. Details regarding the number of larvae, groups and species are given in the classified list.

#### MATERIALS AND METHODS

The planktonic decapoda collected during the cruises of *R V Gaveshani* (Cr. Nos. 10, 12 & 13) were analysed, qualitatively and quantitatively. Zooplankton samples (200 m to surface) were collected using a HT net from 93 stations (Fig. 1) in the Arabian Sea from October to December, 1976. The decapod larvae were present only in 40 samples. The number of larvae was calculated for 100 m<sup>3</sup> of water.

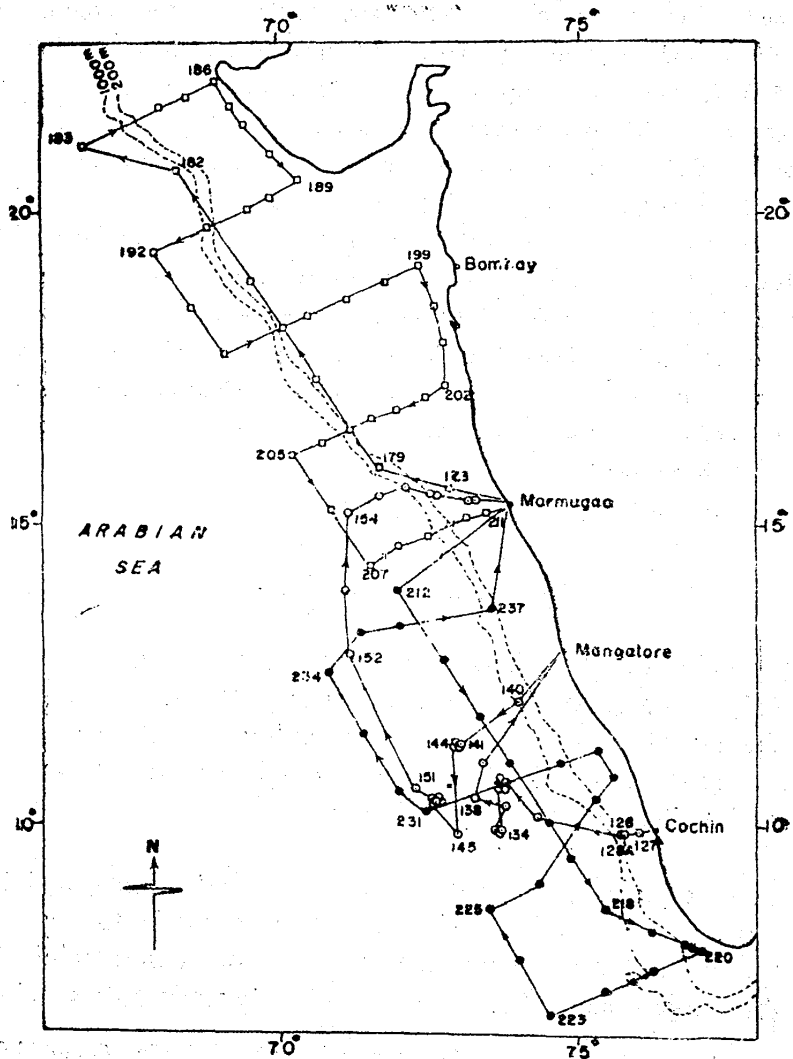


Fig. 1. Station and cruise tracks of *R V Gaveshani* (Cruises 10, 12, 13) in the Arabian Sea.

## RESULTS AND DISCUSSION

During the present study, about 30 forms of the planktonic decapoda were observed in the samples. The larvae belonged to Penaeidae, Sergestidae, Caridea (includes several families), Stenopidae, Thalassinidae, Anomura and Stomatopoda. Their occurrence and abundance in the study area is shown in Figs. 2-4.

*Penaeidae*: Under this family, the subfamilies Penaeinae and Aristaeinae were represented. The larvae of the commercially important penaeid prawns were present only in 6 samples out of 40. 78 larvae of the most common species, *Metapenaeus dobsoni* were recorded. The common genera of penaeid prawns present in the collections were *Metapenaeus*, *Parupenaeopsis*, *Trachy*

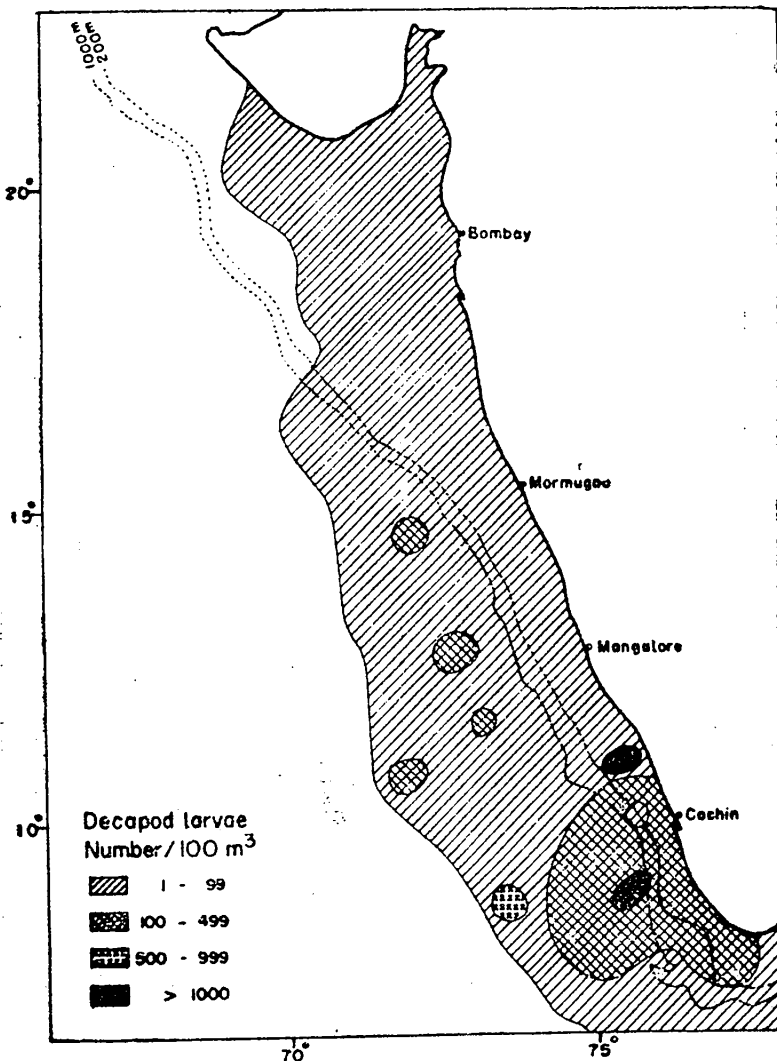


Fig. 2. Distribution and abundance of decapod larvae in the Arabian Sea.

*penaeus*, *Parapenaeus* and *Metapenaeopsis*. However, the larvae of the genus *Penaeus* was not observed in the samples. Larvae of most of these genera occur throughout the year. About 25 larval specimens of the family Penaeidae could not be identified.

The larvae of the subfamily Aristaeinae were obtained from greater depths and majority of them (105) belonged to genus *Aristeus*, a deep water species.

*Sergestidae*: The sergestids were abundant and dominant in the samples. Under the family Sergestidae, the members of the subfamily Luciferinae were common and was represented by 2 species, viz. *Lucifer hanseni* and *Lucifer* types. George and Paulinose (1973) recorded these species from the southwest coast of India. Among these two species, larvae of *Lucifer hanseni* were dominant

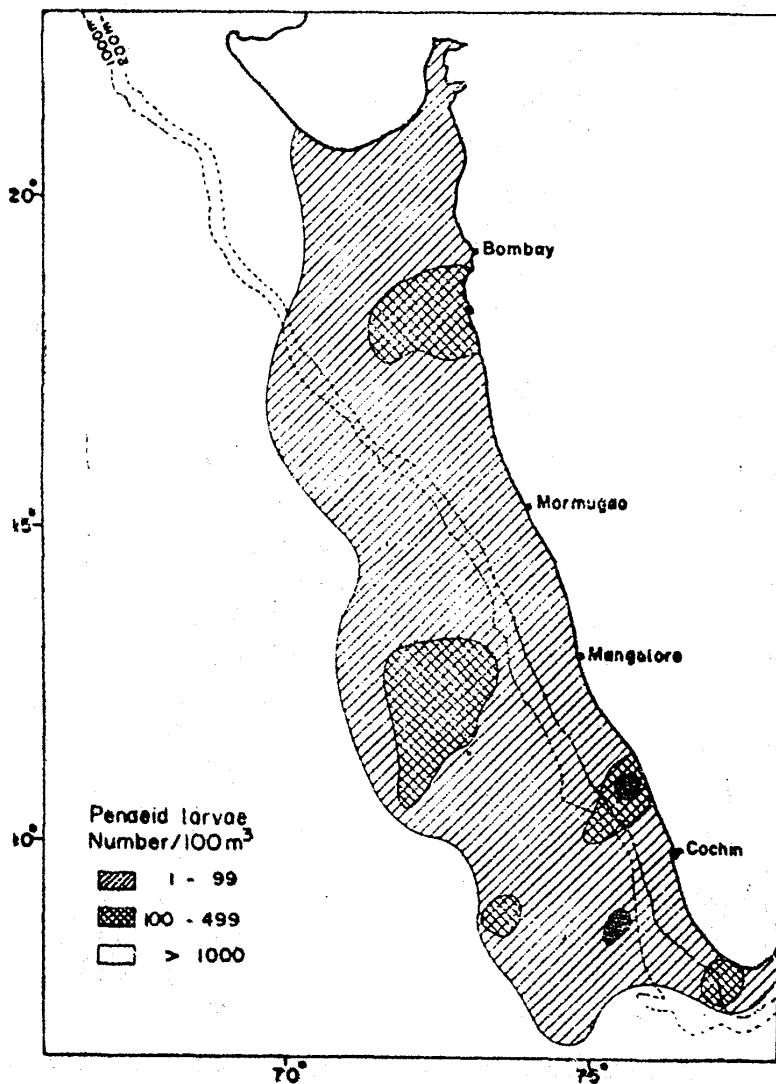


Fig. 3. Distribution and abundance of penaeid larvae in the Arabian Sea.

in the samples. More than 50% of the total decapod larvae collected belonged to genus *Lucifer*. Most of the sergestids belonged to the common genus *Sergestes*. *Acetes* is another genus whose larvae (20) were present in the collections. These shrimps often become a major component in the diet of shore fishes and larger

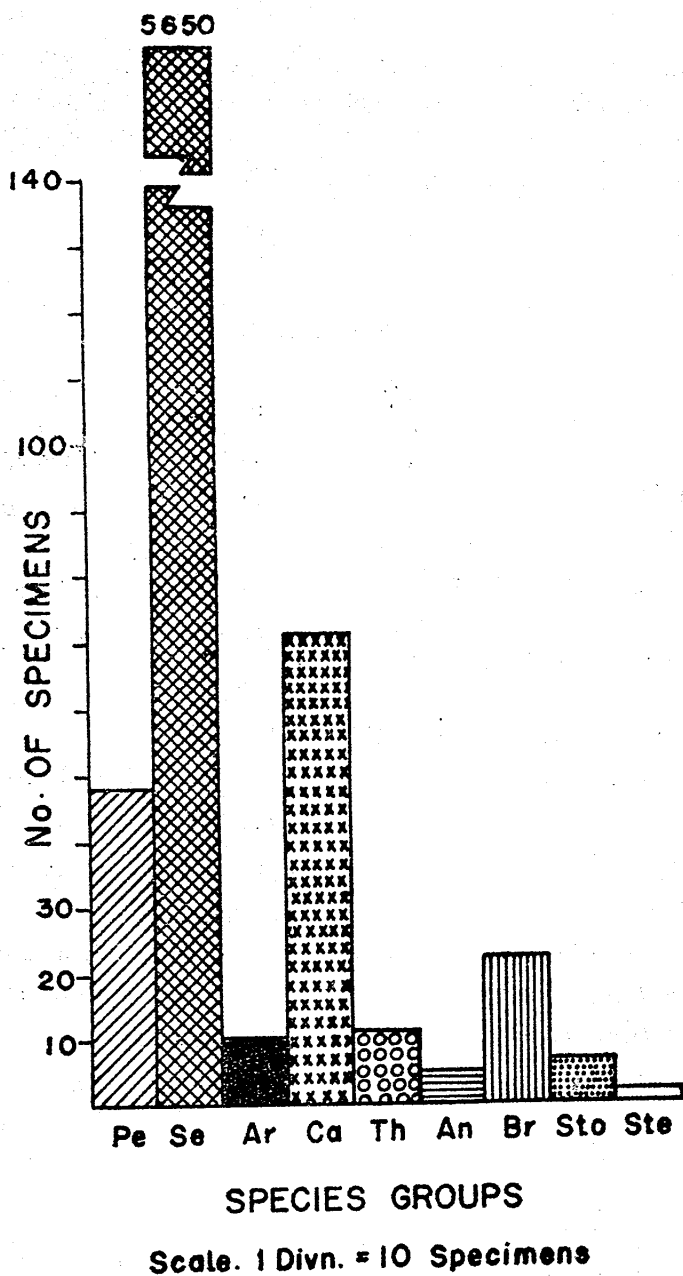


Fig. 4. Group abundance in total collections.

Pe : Penaeidae, Se : Sergestidae, Ar : Aristaenae, Ca : Caridea, Th :  
Thalassinidae, An : Anomura, Br : Brachyura, St : Stomatopoda.

shrimps (Omori, 1974). During certain parts of the year *Acetes* forms conspicuous aggregations near the shore when it is exploited as human food also. The maximum number of planktonic decapoda (1501) was collected from Station 228, on 14.12.1976 (Ga. Cr. 13). This abundance of larvae was mainly due to the presence of *Lucifer* sp. (Fig. 4).

*Caridea*: Caridean larvae were present in 23 samples which belonged to the families — Nematocarcinidae, Pasiphaeidae, Alpheidae, Palaemonidae, Processidae, Pandalidae and Crangonidae. The details regarding the number of larvae, families and genera are given under the classified list.

## CLASSIFIED LIST

Macrura:		Reptantia	
Natantia		Family:	Stenopidea
Family:	Penaeidae	Genus:	<i>Stenopus</i> (5)
Subfamily:	Penaeinae	Thalassinidea	
Species:	<i>Metapenaeus dobsoni</i> (73)	Family:	Axiidae
	<i>Parapenaeopsis stylifera</i> (278)	Genus:	<i>Axius</i> (120)
	<i>Parapenaeopsis stylifera</i> (278)	Anomura:	
	<i>Parapenaeus</i> sp. (41)	Family:	Galatheididae
	<i>Trachypenaeus curvirostris</i> (26)	Genus:	<i>Galathea</i> (20)
	<i>Metapenaeopsis</i> sp. (36)	Family:	Albunidae
Subfamily:	Aristaeinae	Genus:	<i>Albunea</i> (4)
	<i>Aristeus</i> sp. (105)	Brachyura:	
Family:	Sergestidae		Crab zoea (142)
Genus:	<i>Sergestes</i> (1241)		Crab megalopa (79)
Species:	<i>Lucifer hanseni</i> (4172)	Stomatopoda:	
	<i>Lucifer typus</i> (220)	Genus:	<i>Squilla</i> (59)
	<i>Acetes</i> sp. (20)		(Alima larva)
Caridea			
Families:	Nematocarcinidae (2)		
	Pasiphaeidae (334)		
	Alpheidae (163)		
	Palaemonidae (20)		
	Pandalidae (472)		
	Processidae (20)		
	Crangonidae (36)		

Among the families of Caridea; Pandalidae dominated in the samples. The common genera were *Thalassocaris*, *Pandalus* and *Parapandalus*. Menon and Williamson (1971) had reported larval stages of *Thalassocaris* from the Arabian Sea. Pasiphaeidae is the second largest family among the carideans which was represented by the larval genus *Leptochela*. The common species being *Leptochela robusta*, *Pasiphaea* was another genus present in the area. The larvae were present at 5 stations. They usually form a forage species for pelagic fishes (George and Paulinose, 1973). They had a very sparse distribution in the Arabian Sea and were abundant in nearshore stations. The larvae of the family Pandalidae had a wider distribution and were present in 12 samples. The family Nematocarcinidae was represented by a single specimen and is considered to be a very primitive group of caridea. Members of the family Alpheidae were present in 4 samples and was represented by the common genera *Alpheus*, *Athanas* and *Synalpheus*. The family Palaemonidae included some of the economically important species of caridean prawns, such as *Macrobrachium*, *Palaemon* and *Periclimenes*. The larvae of the genus *Crangon* (family Crangonidae) were present only at one station alongwith the larvae of the genus *Processa* (family Processidae).

*Stenopidae*: This family is represented by a single specimen of the genus *Stenopus* whose species could not be identified.

*Thalassinidae*: The thalassinids include the members of families of Axiidae, Callianassidae and Upogebiidae. 120 specimens were present in 7 samples under Axiidae, all of them belonged to genus *Axius*. They have no commercial value other than the taxonomic importance.

*Anomura*: The anomurans of the family Galatheididae showed a wide distribution and occurred in 3 samples, pagurids in one collection and albuneids in 2 samples. The number of anomuran larvae collected was so little that nothing definite could be said on their distribution and abundance.

*Brachyura*: This group included zoeae and megalopa of a wide variety of species of edible crabs belonging to the common genera, such as, *Scylla*, *Portunus*, *Neptunus*, *Charybdis*. The crab larvae formed the third largest group in the present collections.

It is noticed that the early larval stages such as nauplii and protozoeae were not present in the samples, as in the collections of the International Indian Ocean Expedition (1960-'65) too. The large mesh size of the net may be responsible for their absence. The number of species observed in the present collections taken during the NE monsoon (October-December) were less compared to collections made during other cruises of *R V Gveshani* in the same area. Accord-

ding to Menon and Paulinose (1973) the west coast should have been richer with decapod larvae in that period but they were only poorly represented. Larvae of some of the very common species like, *Penaeus* were also not available.

Maximum number of larvae (1501/100 m<sup>3</sup>) and the maximum number of species (11) were obtained at shallow coastal Stations 228 and 219 respectively (Cr. 13, R V *Gaveshani*). The number of larvae were less in samples collected from deeper depths (500-0 m). According to Menon, Menon and Paulinose (1969), the decapod larvae formed an important constituent of plankton but the larvae seldom occurred in large numbers in these collections. Planktonic decapods collected from the Arabian Sea showed the presence of commercially important species of penaeid prawns like *Metapenaeus*, *Parapenaeopsis* and *Trachypenaeus*.

A study of the decapod larvae from the Bay of Bengal (un-published data) showed that the large number of larvae there, was attributed to the presence of a single species, *Lucifer hansenii* (Sergestidae). The comparison of decapod larval abundance from Arabian Sea and Bay of Bengal showed that the latter was richer. The number of larvae obtained from Bay of Bengal was over 11000/100 m<sup>3</sup> and that from Arabian Sea was 7000/100 m<sup>3</sup>. However, the collections were made from August to October in Bay of Bengal. According to Menon and Paulinose (1973) during June to October the Bay of Bengal appears to be calm and richer in decapod larvae and from October to December due to the turbulence of the Bay, east coast has less density and the west coast of India is richer with planktonic decapoda. Maximum number of species obtained was 13 in Bay of Bengal and 11 in Arabian Sea. Menon, Menon and Paulinose (1969) reported maximum of 12 species from 110E collections taken around Minicoy and Maldivic Islands. Hence, the present study reveals that the Arabian Sea and the Bay of Bengal are rich in species and number of larvae.

#### ACKNOWLEDGEMENTS

We are thankful to Dr. B. N. Desai, Director, National Institute of Oceanography, Goa for the encouragement. Thanks are due to Dr. M. Krishnan Kutty Scientist-in-Charge, Regional Centre, NIO, Cochin-18, for his valuable suggestions. We are also thankful to our colleagues who helped us directly or indirectly in collecting and sorting the materials.

#### REFERENCES

George. M. J., and V. T. Paulinose, 1973. On a collection of planktonic decapoda (Penaeidea) from the southwest coast of India. *Handbook to the*



*International Zooplankton Collections, Indian Ocean Biological Centre, Cochin, India*, 5: 60-69.

- Menon, M. K., P. G. Menon and V. T. Paulinose, 1969. Preliminary notes on the decapod larvae of the Arabian Sea. Proceedings of the Symposium on Indian Ocean. New Delhi, 1967. *Bulletin of the National Institute of Sciences of India*, No. 38: 753-757.
- Menon, P. G., 1972. Decapod Crustacea from International Indian Ocean Expedition: The larval development of *Heterocarpus* (Caridea). *Journal of Zoology, London*, 167: 371-397.
- Menon, P. G. and V. T. Paulinose, 1973. Distribution of the decapod larvae in the Indian Ocean. Handbook to the International Zooplankton Collections, *Indian Ocean Biological Centre, NIO*, 5:163-171.
- Menon, P. G. and D. I. Williamson, 1971. Decapod Crustacea from the International Indian Ocean Expedition. The species of *Thalassocaris* (Caridea) and their larvae. *Journal of Zoology, London*, 165: 27-51.
- Nair Vijayalakshmi, R. and V. T. Paulinose, 1980. Decapod larvae from the nearshore waters of Karwar. *Mahasagar - Bulletin of the National Institute of Oceanography*, 13: 277-280.
- Omori, M. 1974. The biology of pelagic shrimps in the ocean. *Advances in Marine Biology*, 12: 233-324.
- Paulinose, V. T., 1979. Decapod Crustacea from the International Indian Ocean Expedition (Larval and postlarval stages of *Parapenaeus* (Smith) (Penaeinae). *Journal of Natural History*, 13: 599-618.
- Paulinose, V. T., 1982. Larval and postlarval stages of *Sicyonia* H. M. Edwards (Decapoda, Penaeidea: Sicyoninae). *Mahasagar Bulletin of the National Institute of Oceanography*, 15: 231-235.
- Rao, P. Vedavyasa, 1973. Studies on the larval development of the commercially important penaeid prawns of India. *Journal of the Marine Biological Association of India*, 15: 95-124.