

Proceedings of the  
FIRST WORKSHOP ON SCIENTIFIC RESULTS OF  
FORV SAGAR SAMPADA

5-7 June, 1989, Cochin

*Sponsored by*

DEPARTMENT OF OCEAN DEVELOPMENT  
&  
INDIAN COUNCIL OF AGRICULTURAL RESEARCH  
NEW DELHI

*Organized by*

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE  
&  
CENTRAL INSTITUTE OF FISHERIES TECHNOLOGY  
COCHIN

OCTOBER, 1990

*Published by*

**Dr. P.S.B.R. JAMES**

**DIRECTOR**

**Central Marine Fisheries Research Institute**

**COCHIN - 682 031**

*Edited by*

**Dr. K.J. MATHEW**

**Central Marine Fisheries Research Institute**

**COCHIN - 682 031**

## PRELIMINARY STUDIES ON PLANKTONIC AMPHIPODS COLLECTED BY FORV SAGAR SAMPADA

S. REVIKALA, K.J. MATHEW AND K.S. SCARIAH

Central Marine Fisheries Research Institute, Cochin-682 031

### ABSTRACT

Studies on the occurrence of amphipods of the EEZ of India and adjoining seas were carried out. The samples which were used for this purpose were collected by Bongo-60 net during the cruises 1-44 of the FORV *Sagar Sampada* (1985-1988). It was found that while amphipods at an average rate of 2,278/1000m<sup>3</sup> occurred in the shelf waters off the west coast, only 1,501/1000m<sup>3</sup> occurred in the same area off the east coast. On the other hand in the oceanic region the numerical abundance was relatively low being 1,014/1000m<sup>3</sup> off the west coast and 925/1000m<sup>3</sup> off the east coast indicating that the amphipods were abundant in the shelf waters of the west coast than other regions. The overall average density for the area investigated showed 1,291/1000m<sup>3</sup>. Regarding the day-night abundance of amphipods in the area investigated, there was not much of variation. The coastwise study of day-night abundance revealed that night collections were more in the eastern Arabian Sea and certain regions of the Bay of Bengal. The seasonwise study showed always maximum during pre-monsoon except the first region off east coast but there was no regular pattern in the eastern Arabian Sea. A regionwise abundance in the various latitudinal sectors was also noticed. The northern region above 20°N off west coast i. e. 4th region, contributed more amphipods than the other latitudinal regions off the west and east coasts.

### INTRODUCTION

The planktonic amphipods, comprised mostly of Hyperiidea are generally oceanic although some species occur in coastal waters. Many of them are holoplanktonic enjoying a global distribution (Pillai, 1986). The amphipods form an important food for many fishes and invertebrates (Nair, 1972). The distribution of amphipods in the Indian Ocean was studied earlier by some workers (Jossi, 1972; Nair *et al.*, 1973). Nair *et al.* (1973) noted that Somali and Arabian coasts had average to good density comparable to that of the Bay of Bengal where high concentration was noted towards northern part of the Bay and highest concentration in the northern part of the Arabian Sea. In the present paper an attempt is made to study the spatial, latitudinal and seasonal distribution, and day-night variations of amphipods for a period from 1985 to '88 in the EEZ and adjoining seas of India.

### MATERIALS AND METHODS

The material and methods have been given in the paper dealing with zooplankton biomass by Mathew *et al.* (1990) in the present volume.

### OBSERVATIONS

#### *Numerical abundance of amphipods*

Numerical differences in shelf and oceanic areas were evident in both the coasts. An average of

2,278 amphipods per 1000 m<sup>3</sup> was present in the shelf areas of the west coast whereas 1,014/1000 m<sup>3</sup> was seen in the oceanic areas of the same coast. Similar observation was made for the east coast where the amphipods averaged 1,501 in the shelf area and 925 in the oceanic areas.

The overall average density for the area investigated showed 1,291/1000 m<sup>3</sup>. Average density of amphipods in the shelf area of both the coasts was 2,000/1000 m<sup>3</sup> of water and in the oceanic area an average of 976 was recorded (Fig. 1). Average day time abundance in the area investigated was 1,274 and that of night was 1,317. Highest percentage of day time abundance was seen during the months of February, July and August. The night time abundance was more during April, June, September and October (Fig. 2).

Seasonal difference in the density distribution of amphipods existed in both the coasts. Apparently more amphipods (2,740-2,012) were caught during cruises made in August and September in the west coast than in the east coast. In the east coast maximum was recorded in the month of February with 5,611.

#### *Spatial distribution* (Fig. 3)

The distribution of amphipods off west and east coasts showed numerically very high concen-

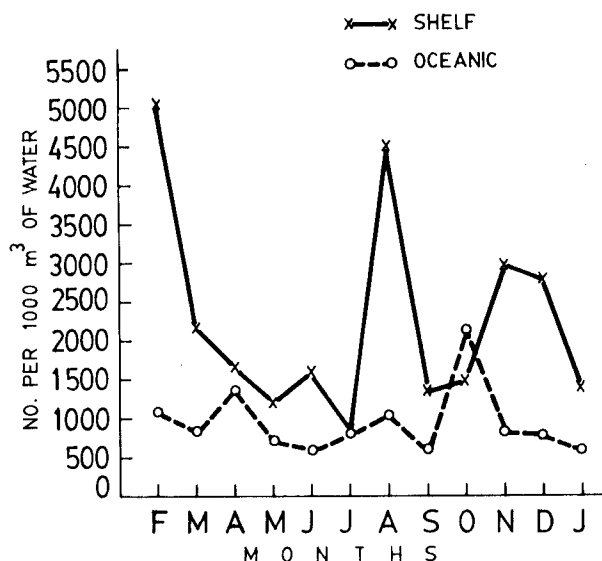


Fig. 1. Distribution of amphipods in the shelf and oceanic areas investigated.

traion in specific locations. A population density of 5,000 specimens per 1000 m<sup>3</sup> of water and above has been recorded off Kandla, between off Bombay and off Kandla, Mangalore and Wadge Bank area of south of peninsular India, and off Paradip, Madras, Gulf of Mannar off east coast and Andaman and Nicobar Islands.

The density distribution in the range of 2,001-5,000 has been recorded along the southwest coast of India, off Ratnagiri and northern part of the eastern Arabian Sea. Similar density distribution in the east coast was recorded off Madras, off Paradip between

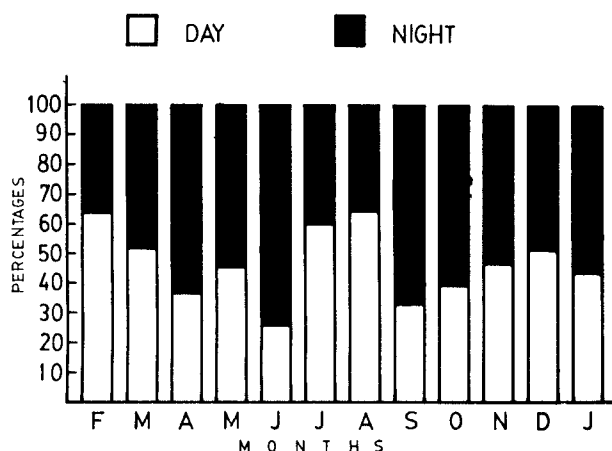


Fig. 2. Day and night variations of amphipods in the area investigated.

Visakhapatnam and Kakinada and near Andaman and Nicobar Islands.

A still lower density ranging between 1,001-2,000 and between 501-1,000 has been represented uniformly off the west and east coasts.

The lowest density distribution of amphipods in the range of 1-500 has been recorded more frequently off east coast than off west coast.

*Coastwise, regionwise density distribution* (Fig. 4)

For the sake of convenience of study, both the coasts were divided into 4 latitudinal regions as region 1 (5°N-10°N), region 2 (10°N-15°N), region 3 (15°N-20°N) and region 4 (above 20°N).

Off the west coast, the region 4 showed a maximum of 3,098/1000 m<sup>3</sup> followed by the region 1 with 1781, region 2 with 1,128 and region 3 with 990/1000 m<sup>3</sup> of water.

Off the east coast, the region above 20°N i.e., 4th region showed a maximum density distribution of 1,202 followed by region 2 with 1,101 and regions 1 and 3 with 1,092 and 1,023 of amphipods per 100 m<sup>3</sup> of water respectively.

*Coastwise, regionwise, shelf & oceanic distribution* (Fig. 5)

The density maximum of amphipods for shelf region off west coast between 5°N-10°N (region 1) was at the magnitude of 3,739 followed by the region 4 with 2,429, region 3 with 2,004 and region 2 with 1,250/1000 m<sup>3</sup> showed the least.

The oceanic region off west coast showed population density of amphipods with a maximum of 3,372/1000 m<sup>3</sup> in the region four, 834 in the region one, 682 in the 2nd region and 853 in the 3rd region.

The shelf region off east coast showed a maximum density of 1,996 in the region between 5°N-10°N (1st region) followed by 1,773, 1,169 & 1,252 of amphipods in the 2nd, 3rd & 4th regions respectively.

The oceanic region off east coast on the other hand showed a density of 1,139/1000 m<sup>3</sup> in the region above 20°N (4th region) followed by 9,64, 899 and 872 per 1000 m<sup>3</sup> in the 3rd, 2nd and 1st regions respectively.

*Coastwise, regionwise seasonal abundance* (Fig. 6)

Various regions off west coast showed the population density distribution of amphipods in the

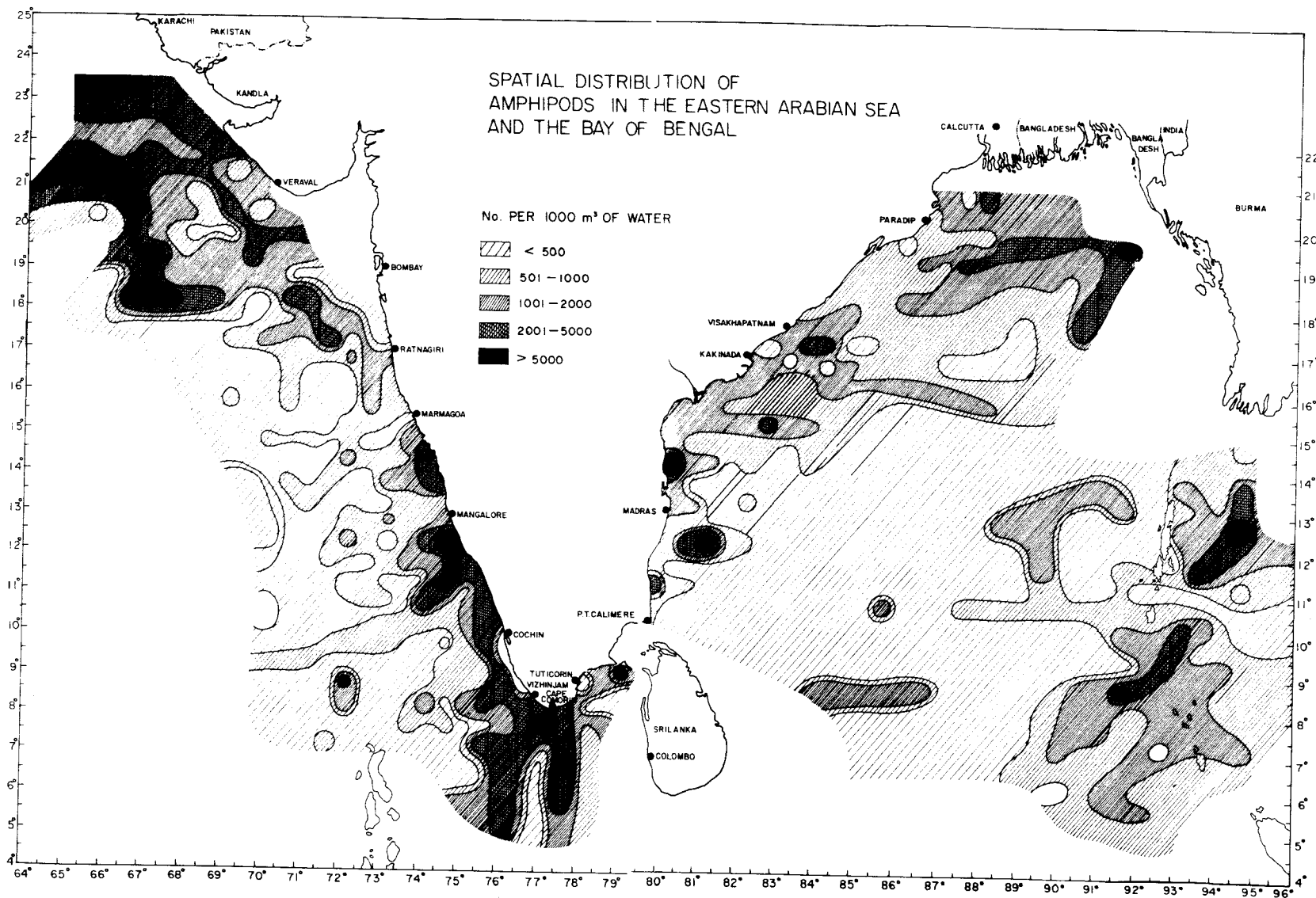


Fig. 3. Spatial distribution of amphipods.

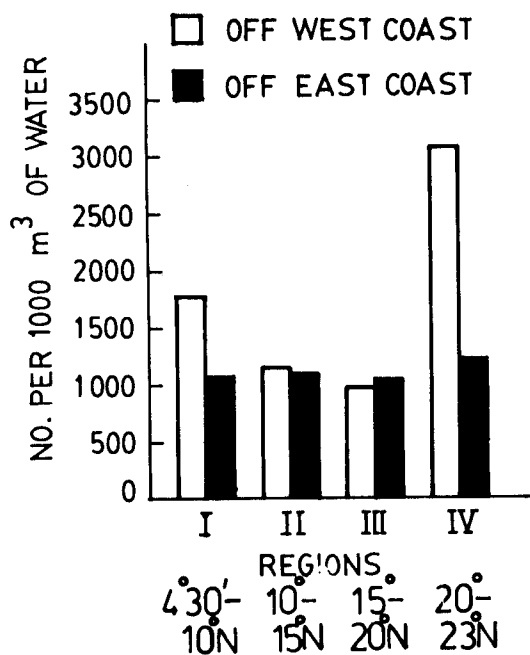


Fig. 4. Coastwise, regionwise density distribution of amphipods.

following manner during premonsoon, monsoon and postmonsoon seasons. The 1st region between 5°N-10°N had a density at the rate of 483/1000m<sup>3</sup>, 3,155/1000m<sup>3</sup>, and 1,240/1000m<sup>3</sup> during premonsoon, monsoon and post monsoon seasons. The respective figures for the 2nd, 3rd and 4th regions were 470, 1,167 & 1,364; 2,413, 619 & 1,124 and 2,857, 1,590 & 3,542 during the above said seasons in order.

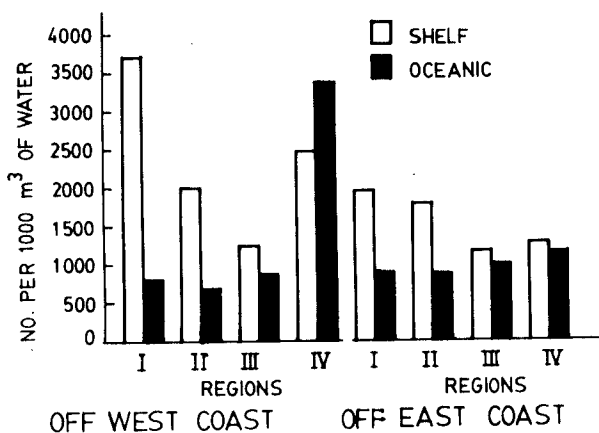


Fig. 5. Coastwise, regionwise shelf and oceanic distribution of amphipods.

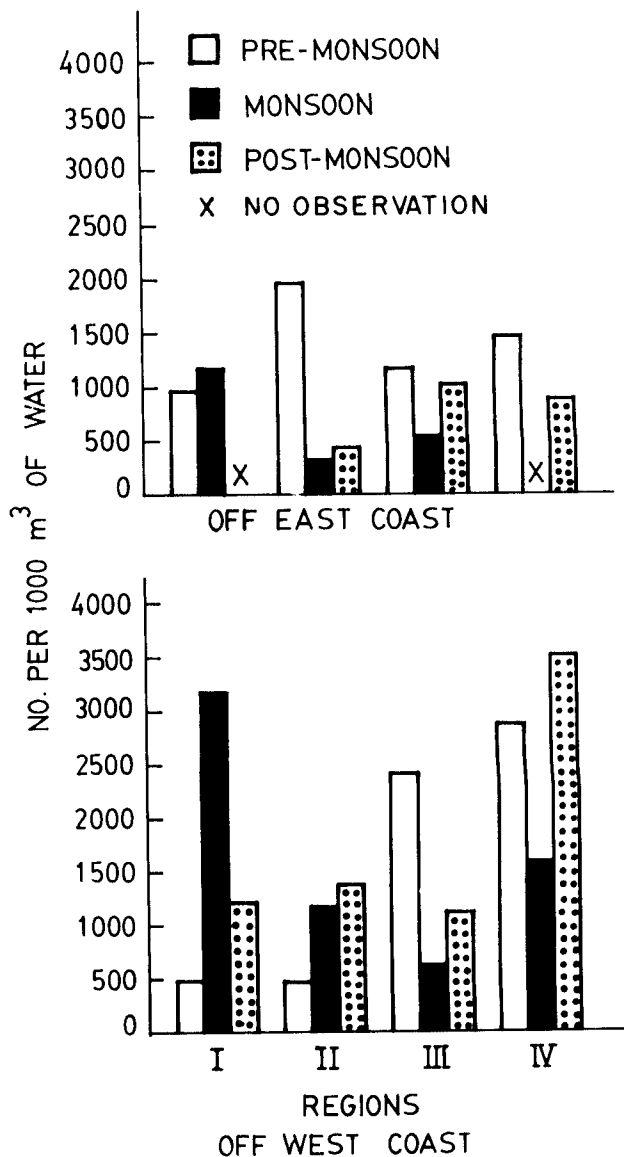


Fig. 6. Coastwise, regionwise seasonal abundance of amphipods.

The different regions off east coast had a density of amphipods at the rate of 988 & 1,198 during premonsoon and monsoon in region 1; 1,986, 330 and 440 amphipods per 1000 m<sup>3</sup> during premonsoon, monsoon and postmonsoon in region 2; 1,169, 534 and 1,043 during premonsoon, monsoon and postmonsoon in region 3 and 1,457, 882 during premonsoon and postmonsoon seasons in region 4.

*Coastwise, regionwise, day and night abundance (Fig. 7)*

The collection during day off the west coast showed a density distribution maximum of am-

phipods in the region above 20°N i.e., 4th region with 2,901. The amphipods in region 3 was least with 746. In 2nd and 1st regions it showed 1,047 and 1,932 of amphipods per 1000 m<sup>3</sup> respectively.

The density maximum for night collection was recorded in region 4 with 3,470 of amphipods. The regions 1, 2 & 3 showed the numbers 1,451, 1,223 and 1,334 respectively.

The collection during day off east coast showed a maximum of 1,215 in the region 1, and 1,123, 935 & 1,127 were noted in region 2, 3 & 4 respectively.

The night collections off east coast showed a maximum of 1,379 in the 4th region. The regions 1, 2 & 3 showed 890, 1,067 and 1,157 amphipods per 1000 m<sup>3</sup> of water respectively.

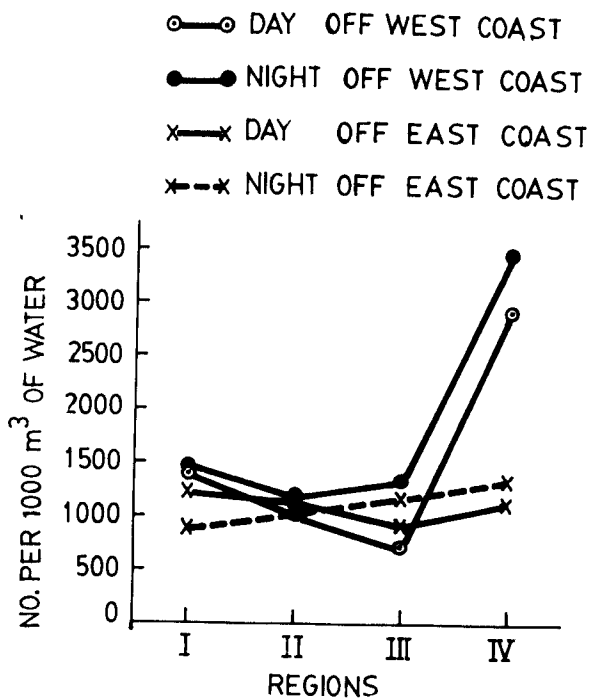


Fig. 7. Coastwise, regionwise day and night abundance of amphipods.

## DISCUSSION

The study during the period of 1985-'88 revealed that the northern part of the eastern Arabian Sea with 44% had the maximum concentration of amphipods. Similar was the situation in the Bay of Bengal. Among the coasts, about 57% of amphipods was contributed by the west coast. Similar observations were made by Nair *et al.* (1973). The present observations showed that the central part of the eastern Arabian Sea had the least abundance of amphipods. A comparison of the shelf and oceanic areas revealed that amphipods had a numerical abundance in the shelf areas than in the oceanic areas. There was no regular pattern of distribution of amphipods during various seasons in the eastern Arabian Sea but in the Bay of Bengal except in the southernmost part, all other regions showed a maximum during the premonsoon season. Regarding day-night abundance, night collections showed more off the west coast and in certain regions in the Bay of Bengal.

## ACKNOWLEDGEMENT

The senior author is thankful to Department of Ocean Development for financial assistance.

## REFERENCES

- JOSHI, J.W. 1972. Distribution and abundance of pelagic amphipods in the Arabian Sea, Java Sea and Indian Ocean with notes on their contribution to the total zooplankton. *J. mar. biol. Ass. India*, 14 (1) : 115-138.
- MATHEW, K. J., T. S. NAOMI, GEETHA ANTONY, D. VINCENT, R. ANILKUMAR AND K. SOLOMON, 1990. Studies on zooplankton biomass and secondary production of the EEZ of India. *Proc. First Workshop Scient. Resul. FORV Sagar Sampada*, 59- 69.
- PILLAI, N.K. 1986. *Introduction to Planktonology*. Himalaya Publishing House, Bombay, 104 pp.
- NAIR, K.K.C. 1972. A note on an amphipod swarm along the south- west coast of India. *Curr. sci.*, 41 (5) : 185-186.
- NAIR, K.K.C., P.G. JACOB AND S. KUMARAN 1973. Distribution and abundance of planktonic amphipods in the Indian Ocean. *The Biology of Indian Ocean. Ecological studies 3*. Bernt Zeitzschel (Ed.), Springer-Verlag, New York.