

ON ABUNDANCE AND OCCURRENCE OF SERGESTIDS *SERGESTES* AND *SERGIA* (CRUSTACEA:DECAPODA) IN THE SAMPLES COLLECTED DURING INTERNATIONAL INDIAN OCEAN EXPEDITION (IIOE)

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ABSTRACT

The paper deals with holopelagic shrimps *Sergestes* and *Sergia* described from the Indian Ocean. The frequency of occurrence and abundance of *Sergestes* and *Sergia* in different regions of the Indian Ocean were determined based on the sub-sorted samples on board of nine international cruise ships during the International Indian Ocean Expedition 1960-1965. Of the 869 specimens, 1459 stations of *Sergestes* and 327 specimens, 608 stations of *Sergia* were identified and examined including the adults and juveniles of both the sexes.

Key-words: *Sergestes*, *Sergia*, Sergestids, Indian Ocean, frequency of occurrence and abundance.

INTRODUCTION

The International Indian Ocean Expedition (IIOE) 1960-65 obtained a large collection of planktonic samples which are being studied at the Marine Reference Collection and Resource Centre. The material under study is separated from the samples obtained on board the ships Anton Brunn, Argo, Conch, Diamantina,

Discovery, Gascoyne, Kistna, Koyo Maru, Meteor, Natal, Oshoro Maru, Patanella, Pioneer, Varuna, Vitiaz and Zulun, abbreviated as AB, AR, CO, DI, DM, GA, KI, KO, ME, NA, OS, PA, PI, VA, VI and ZU respectively. The cruise tracks and the distribution of these ships during the IIOE are shown in Fig.I. The Sergestids separated from the samples belong to two genera –*Sergestes* and *Sergia*. Among the genera *Sergestes* and *Sergia*, the species are of particular interest and subsequently observed from IIOE samples (Kazmi and Yousuf, in press).

Literature concerning the distribution and abundance of Sergestids in the Indian Ocean is very poor. The specimens of Sergestids were identified to species level. In this paper to examine the frequency of occurrence, abundance per haul of sexes, adults and juveniles. The results of different cruises are compared with distribution and depth/time in the sample by Tables are traced of all IIOE stations.

MATERIALS AND METHODS

The International Indian Ocean Expedition was a multinational programme in which 19 ships from nine countries participated. The expedition began on April, 1960 and came to an end in April, 1965. Plankton samples collected over this period during nine cruises, by the staff of the Indian Ocean Biological Centre (IOBC) at Cochin, India sorted a large collection of Sergestids which was loaned to and studied at the Marine Reference Collection and Resource Centre, Karachi. Most of the samples were collected in uniform numbers with stations, using the Indian Ocean Standard net (IOS) designed by Cruise (1963). The net was towed vertically at a depth of 200 m to the surface (IOBC, 1963).

A typical sample represents about 400-500m³ of water per/haul. The sorted specimens of different ships and cruises based on aliquots (sub-sample) from various localities and depths (mostly 200 m), were calculated as a percentage of total sample (Figs.-2-5).

The specimens are grouped into 1-5 classes of organisms in each class. The frequency of occurrence and abundance in different geographical regions was calculated (Figs.2-7). The total specimens of *Sergestes* 1782 from 1398 stations of the following ships; (Figs.-2-3), AB(520), Ar(159), Di(160), Dm(233), Ga(3), Ki,(218), Ko (5), Me(105), Na(29), Os(98), Pa(53), Pi (22), Va (88), Vi (10), Zu (79) and *Sergia* including two species, the total number of specimens 701 from 632 stations AB (155), Ar (56), Co (21), Di(35), Dm(69), Ga(67), Ki,(2), Ko(53), Me(44), Os (84), Pi(45), Va(37),Vi(33) have been further identified and the abbreviation used for average numbers of adult males AM, adult females AF, juvenile males as JM, juvenile females as JF.

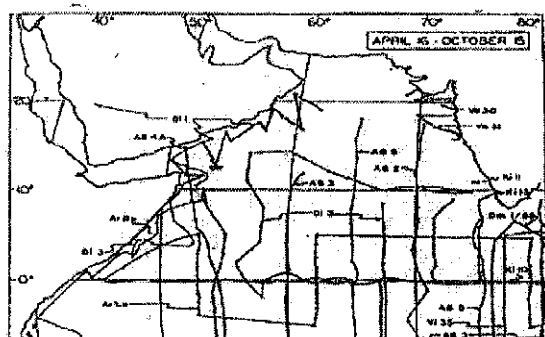


Fig. 1

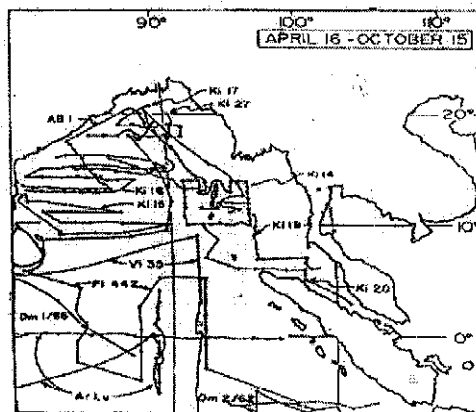


Fig. 2

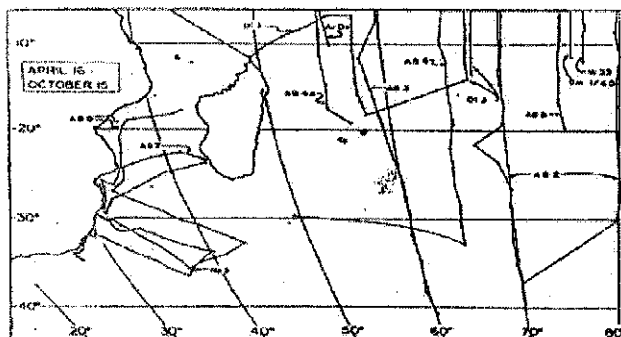


Fig. 3

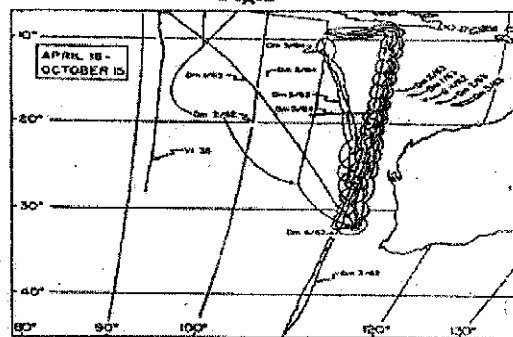


Fig. 4

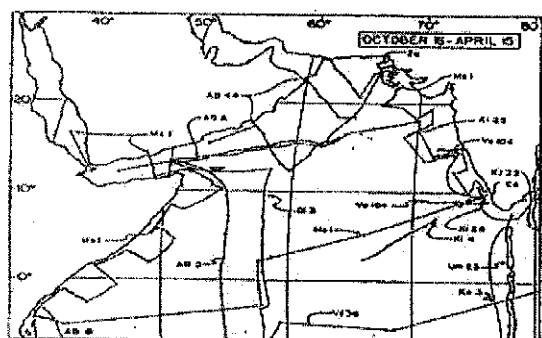


Fig. 5

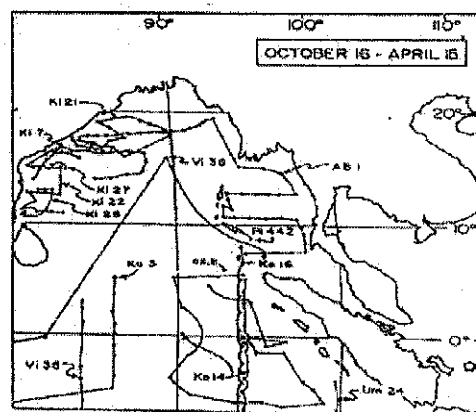


Fig. 6

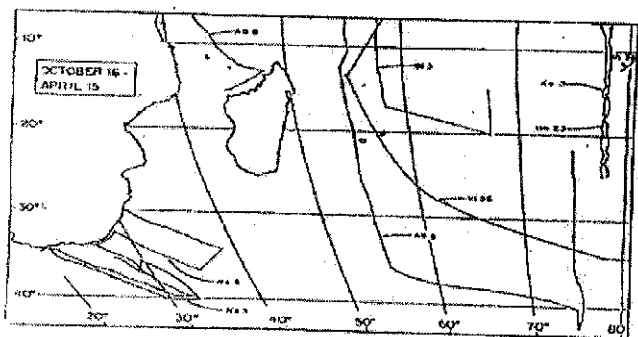


Fig. 7

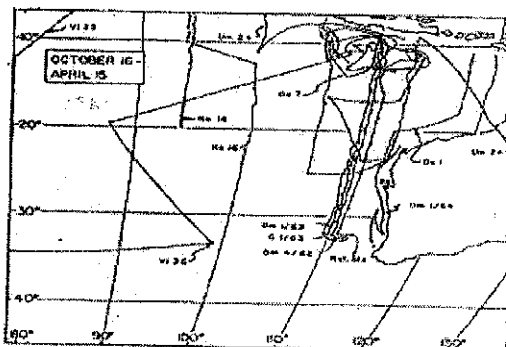


Fig. 8

Fig.1. Cruise tracks of various international ships during IIOE. Symbols of ships and positions of sampling are given (Courtesy of IOBC, Cochin, India).

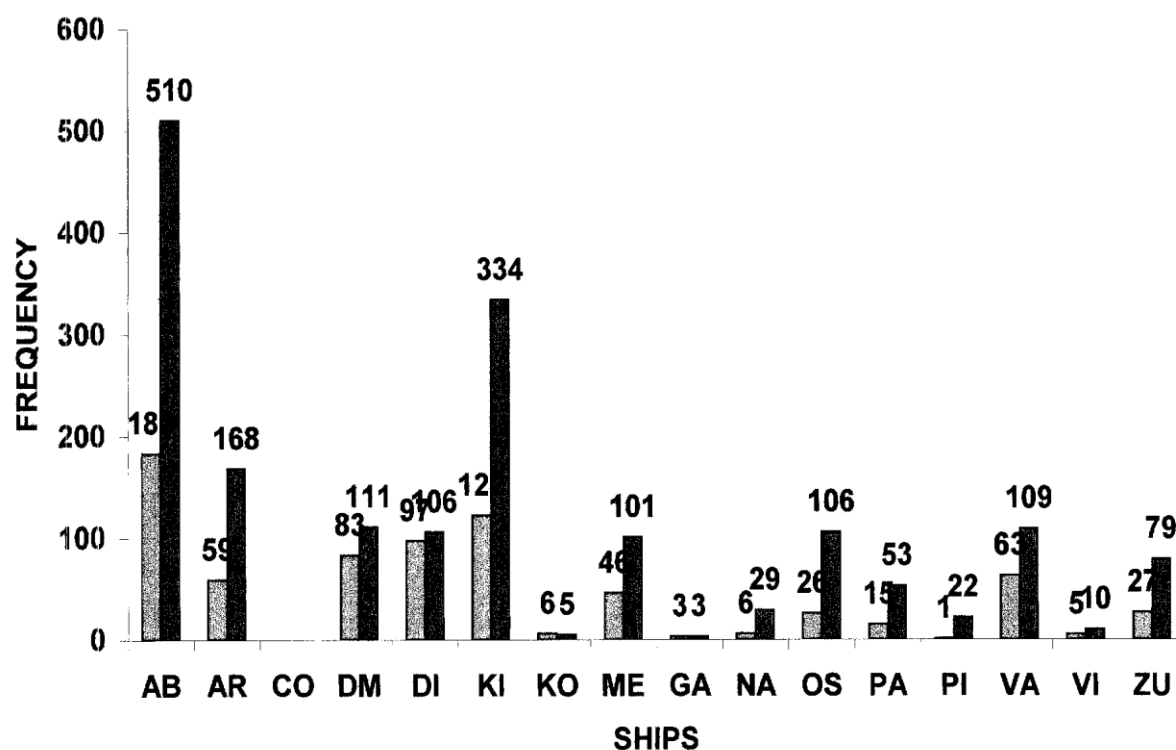


Fig.2. Total numbers of all ships of *Sergestes* spp.

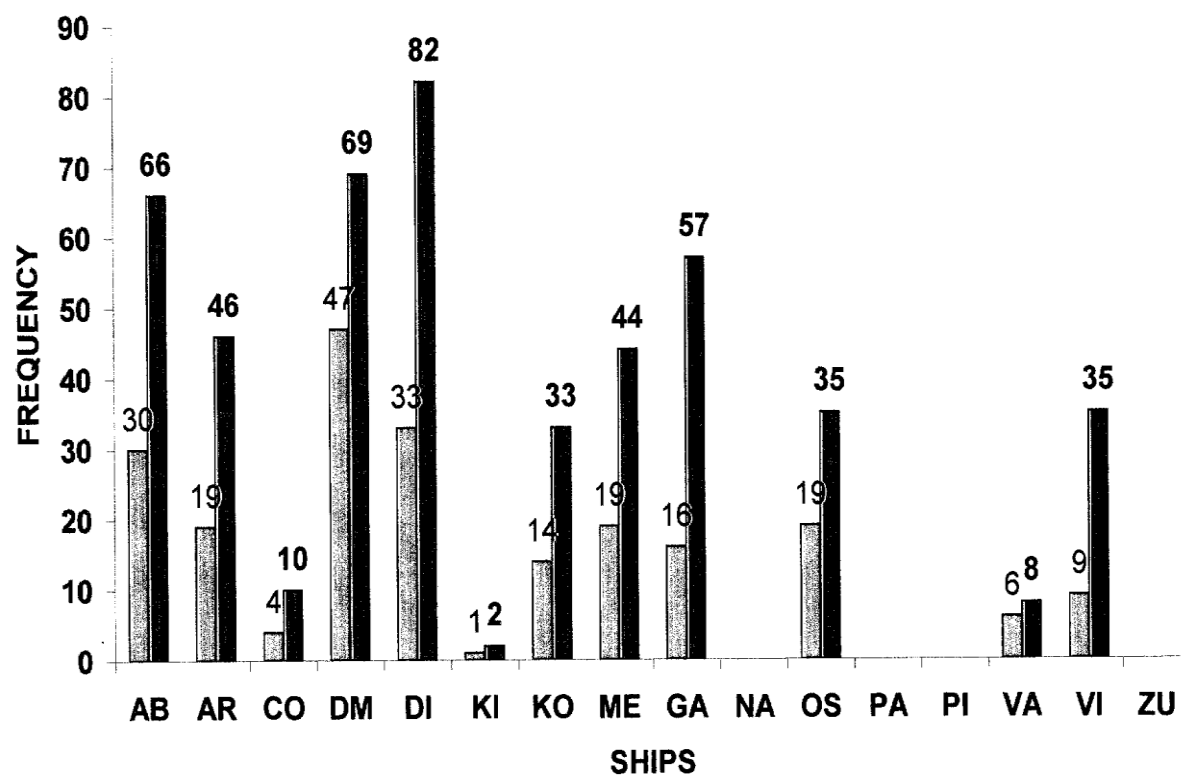


Fig.3. Total numbers of all ships of *Sergia* spp.

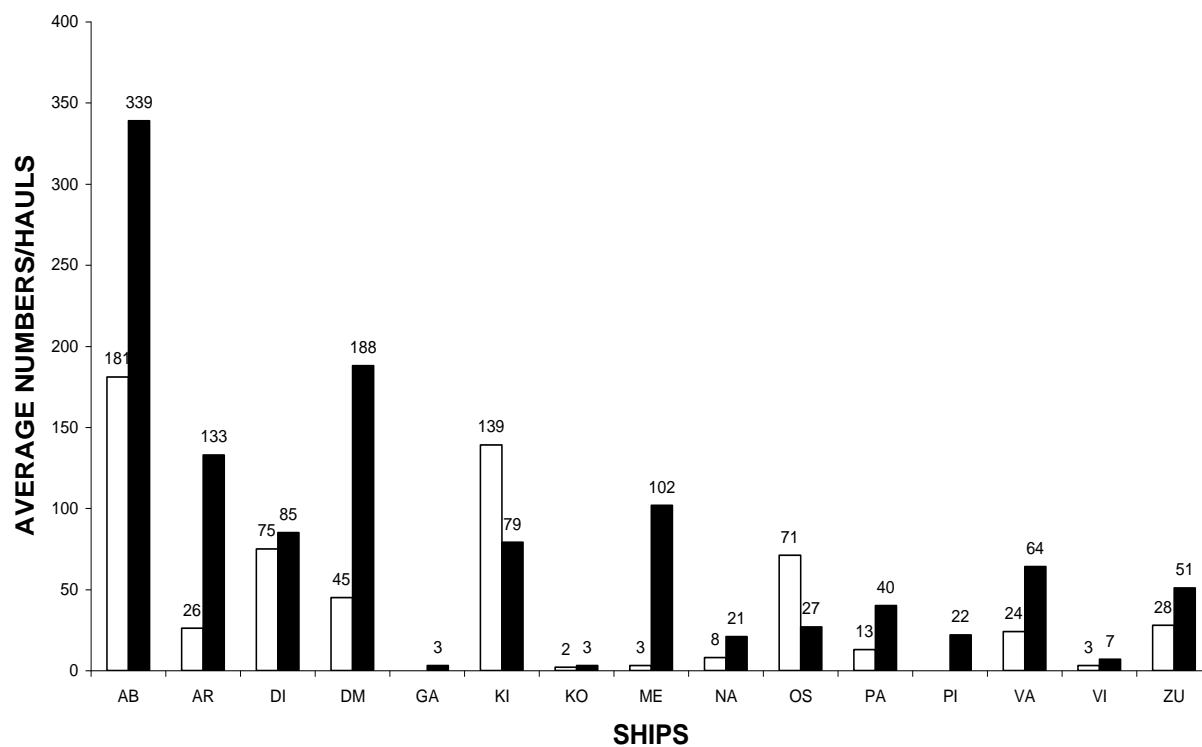


Fig.4. Average numbers of adult and juvenile males and females of *Sergestes* species on fifteen international cruises of IIOE.

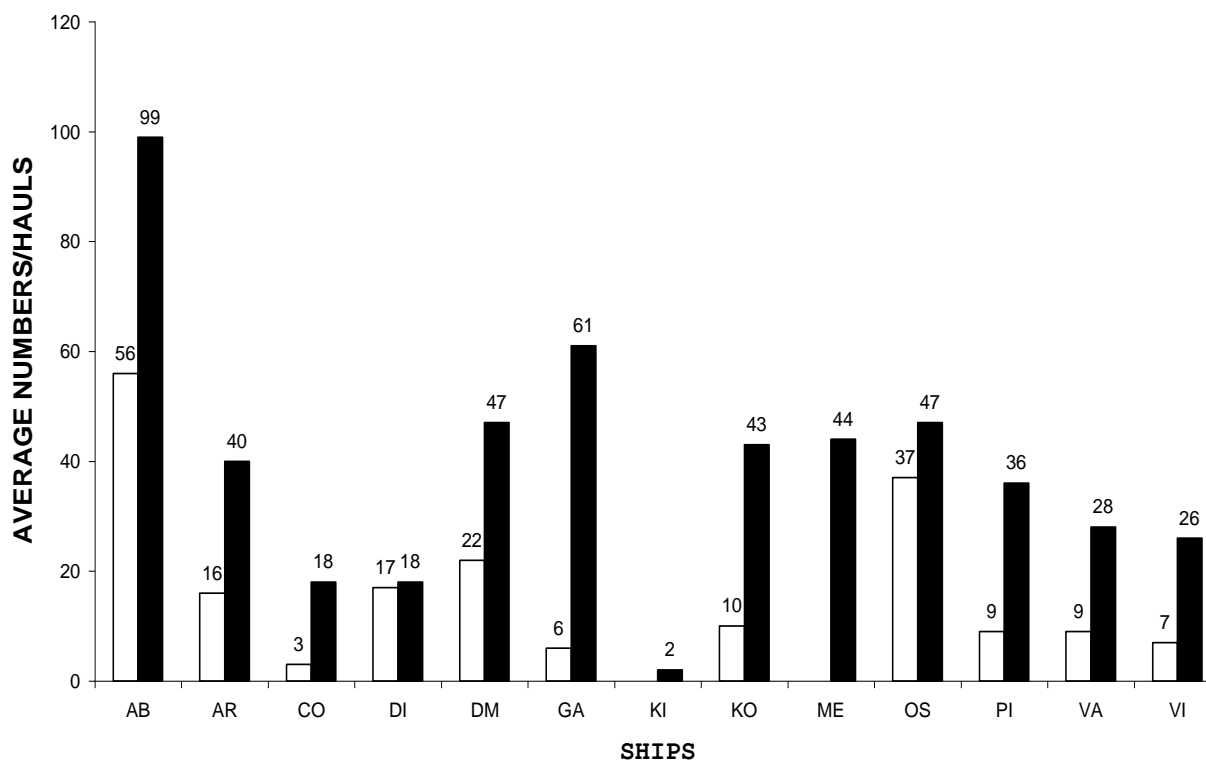


Fig. 5. Average numbers of adult and juvenile males and females of *Sergia* species on thirteen International cruises of IIOE.

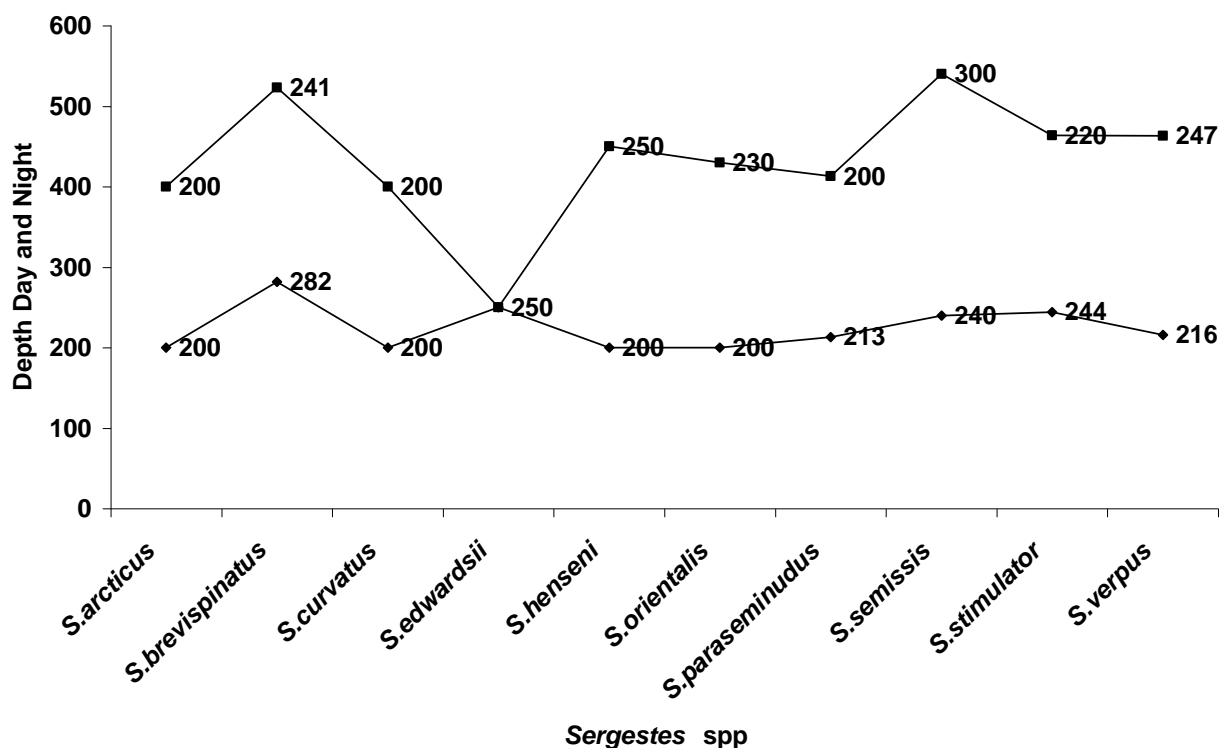


Fig.6. Vertical distribution of all *Sergestes* spp.

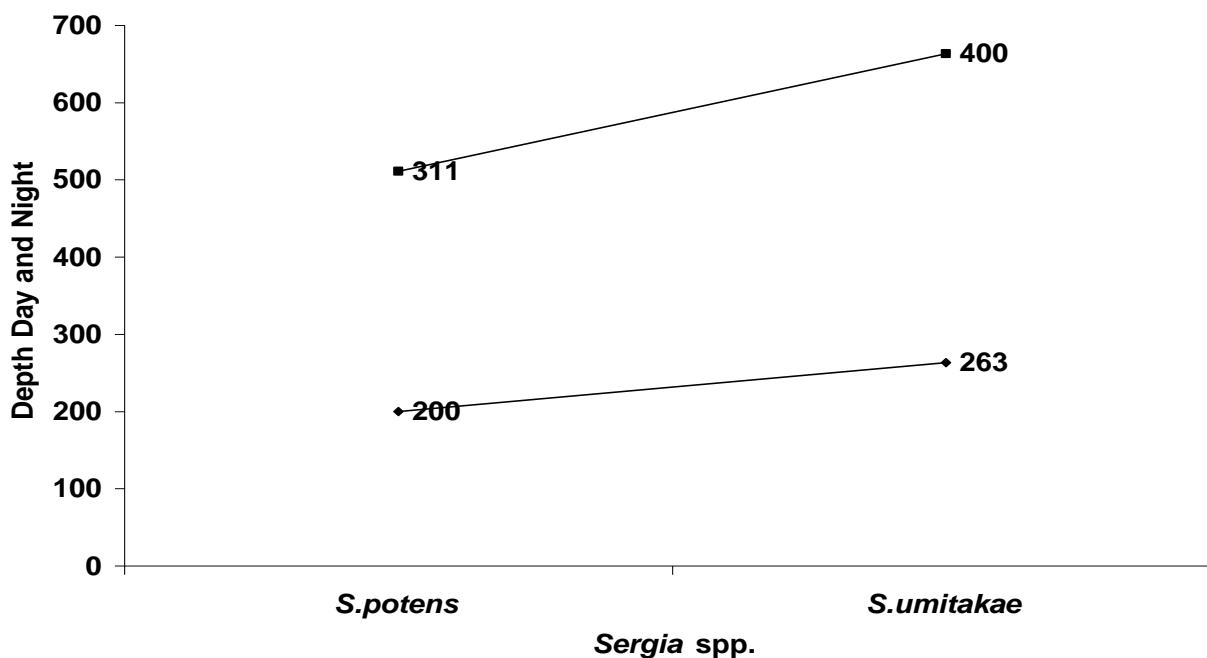


Fig.7. Vertical distribution of all *Sergia* spp.

RESULTS

The adults and juveniles were usually found together but juveniles were also found without adults. The number of specimens per sample varied from (AB –VA) shows dominance of 1-5 class for the ships Anton Brunn, Argo, Discovery, Gascoyne, Koyo Maru, Oshoro Maru, Pioneer, Varuna respectively but only Conch shows 1-3 class, whereas the dominance of largest class (1-5) was found on Anton Brunn, Zero in Fig.2-5 does not mean the absence from the region at all, but indicates its absence in the samples taken.

The Fig.2-3 show the relative abundance and frequency of occurrence of *Sergestes* and *Sergia* taken on nine international ships. The largest was taken on Anton Brunn and the lowest were noted for Koyo Maru and Varuna (stations). The medium were noted for other ships: Discovery (stations), Gascoyne (stations), Oshoro Maru (stations), Argo (stations), Pioneer (stations), Conch (stations). In the Indian Ocean wider distribution shows the tracks of ships location of stations. The highest abundance was found in NE-Monsoon period. The average numbers of *Sergestes* adults and juveniles per haul indicate that adult males and juvenile males of *Sergestes* were higher on (AB, DI, KI, OS) ships. Highest adult females and juvenile females were AB, AR, DM, KI, ME in males and females but no juvenile on this ship. Average numbers of adult males on AB were 146 and adult females on AB 170 whereas juvenile females on KI were 59 and juvenile females on AB 169. *Sergia* showed with 39 adult males on AB and 78 adult females on AB, whereas 17 juvenile males on AB and 31 juvenile females on GA. The abundance of specimens was low mainly due to type of net used.

DISCUSSION

Survey efforts in the Indian Ocean have resulted in an extremely uneven distribution of sampling effort with most attention having been given to the northern and far-western regions. Much of the available data for the Indian Ocean as a whole is described from the 1960-65 International Indian Ocean Expedition of three decades ago.

The main considerations for starting the International Indian Ocean Expedition (IIOE) of all the world oceans, the Indian Ocean was the least studied ocean. Most of the countries bordering the Indian Ocean are developing, and at a low level of economic development. The Indian Ocean poses several features that are totally different from those of the other oceans. The land-locked nature of the Indian Ocean on its northern boundary by the land-mass of Asia, and the biannual reversal of the direction of winds known as the monsoon, are unique characteristics of this Ocean due to the seasonal reversing of the boundary currents in the northern Indian Ocean, the monsoon gyre does not mix to a great degree with equatorial waters and can be considered a closed circulation system, with the Arabian Sea portion showing high levels of production and salinity, and the Bay of Bengal exhibiting nearly estuarine conditions with the tremendous amount of riverine input. Although the Indian Ocean has historically served as a well known route for Sea trade little is known about it surprisingly the Challenger Expedition (1872-1876) which marked the birth of modern oceanography, omitted the northern half of the Indian Ocean –the Arabian Sea while several later expeditions did come to this region from time to time, it took the International Indian Ocean Expedition (1960-1965) to make a combined assault on the largest unknown area on earth- the deep waters and seabed of the Indian Ocean (Behrman, 1981).

Information on planktonic crustaceans in general, especially in the upper 200m of the Indian Ocean has considerably enhanced by the studies of zooplankton samples collected during the International Indian Ocean Expedition IIOE of 1960-65 According to Qasim (1999) this collection is the largest available from any ocean in the world today where 9 nations contributed in the collections of the samples.

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