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OBSERVATIONS ON THE DISTRIBUTION AND SEASONAL FLUCTUATIONS OF CHAETOGNATHS OFF VIZHINJAM, SOUTHWEST COAST OF INDIA

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ABSTRACT

The distribution and seasonal abundance of Chaetognaths belonging to the genera *Sagitta* Quoy and Gaimard and *Pterosagitta* Costa collected during the cruises of *Cadalmin-VI* between January and December, 1990 from three sectors off Vizhinjam, on the southwest coast of India, were studied in relation to hydrographic factors. *Sagitta enflata* was the most dominant species for the greater part of the year and the present study revealed that this species is a continuous breeder with several peaks of intensive spawning. Species such as *Sagitta farox. S. robusta* and *S. pacifica* are recorded only during the premonsoon and later postmonsoon periods.

INTRODUCTION

CHAETOGNATHS form one of the major constituents of the marine zooplankton and play an important role in the food chain. Information on the taxonomy and distribution of this group from the west coast of India is available from the works of Lele and Gae (1936); George (1952); Silas and Srinivasan (1968, 1969, 1970) and Srinivasan (1972, 1975, 1976, 1979, 1987). From Trivandrum coast there is only a preliminary account on chaetognaths by Pillai (1944). Further, Menon (1945) and Divakaran *et. al.* (1980) studied the plankton off the Trivandrum and Vizhinjam waters respectively and reported the occurrence of 4 or 5 species of chaetognaths. However, these studies do not present a comprehensive picture of their ecology, distribution and seasonal abundance in the plankton and hence the present investigations were undertaken to get such information from the sea off Vizhinjam and the results are presented in this paper.

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MATERIAL AND METHODS

The method of plankton collection and analyses of the samples were the same as those reported earlier (Jacob *et al.* 1987). The material for this study was obtained from the plankton samples collected during the cruises of *Cadalmin-VI* between January and December 1990 from the Central, Southern and Northern sectors off Vizhinjam. Simultaneously the hydrographic data of the surface sea water samples were recorded.

RESULTS

Species composition

Seven species of Chaetognatha belonging to the genera *Sagitta* and *Pterosagitta* are present in the plankton samples of the three sectors off Vizhinjam and their relative abundance (i.e., in percentages) are shown in the Figure 1.

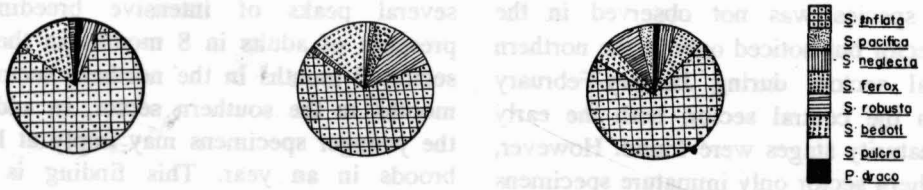

FIG. 1. *Relative abundance of chaetognaths in the three sectors off Vizhinjam.*

Distribution and seasonal abundance

Figure 2 gives the details of the occurrence and seasonal abundance of the seven species of Chaetognatha and their maturity stages.

Sagitta enflata Grassi

This was the dominant species in all the three sectors and formed 68-79% of the total number of chaetognaths in the three sectors of collection. Though this species was common throughout the year a striking peak was in April in the central and northern sectors and in October in the southern sector. Specimens of either early or late maturing stages were present in the samples collected in almost all the months and this clearly shows that this spawns throughout the year but with periods of more intensive reproduction during certain months.

Sagitta bedoti Beraneck

This was the next in abundance numerically in the central and southern sectors. In all the sectors this species showed two distinct peaks, the primary being in March and the secondary one in November. Further, this species appeared to be more limited in their times of reproduction and breeding is not continuous unlike in *S. enflata.* The presence of mature specimens in November in the northern and southern sectors suggest that breeding has taken place during post-monsoon period. However, in the central sector they were observed only in July.

Sagitta neglecta Aida

Sagitta neglecta ranked third in the order of numerical abundance in both the central and southern sectors where as in the northern sector it was the 5th among the most common species. This species was well represented in the samples of the central and northern sectors during the pre-monsoon period and in the southern sector during the post-monsoon period. However, in the central and southern sectors it was distributed in moderate numbers during the monsoon period also. Both the early and late stages of maturity were recorded during the pre-monsoon and monsoon months. However, in the southern sector only early stages of maturity were observed in October.

Sagitta ferox Doncaster

This species was well represented in the samples collected from the central and northern sectors than from the Southern sector. It is interesting to note that this species was observed only during the pre-monsoon (February-May) period. Further, in all the sectors only the immature specimens were represented.

Sagitta robusta Doncaster

Sagitta robusta was abundant in the northern sector than in other sectors and present in all the sectors only during the pre-monsoon period. In the central sector only the early stages of maturity were seen whereas in the other sectors mature specimens were recorded.

Sagitta pacifica Tokioka

This species was not observed in the southern sector but noticed only in the northern and central sectors during January-February months. In the central sector, both the early and late maturity stages were found. However, in the northern sector only immature specimens were observed.

Sagitta pulchra Doncaster

The occurrence of this species was very rare and encountered only in one collection during November in the central sector and all of them were in the late stages of maturity.

Pterosagitta draco (Krohn)

This species was collected only during January and November in the southern and northern sectors respectively and the specimens were in the early stages of maturity. However, in the central sector, only the late stages of maturity were observed in November.

Environmental Features

Among the various hydrographical parameters only temperature, salinity and dissolved oxygen were analysed as these environmental parameters showed a similar trend as reported earlier by Rani Mary George (1988), the results are presented in Fig. 2.

Discussion

The composition and the pattern of seasonal abundance of chaetognaths in the three sectors off Vizhinjam were observed to be more or less similar to those observed off. Bombay, Kanara and Malabar coasts (Lele and Gae, 1936; George, 1952; Srinivasan, 1976). As in Vizhinjam area, in most of the stations in the inshore waters of the southwest coast of India. *Sagitta enflata* was the most dominant species in the plankton community. Further, from the presence of immature and mature specimens of *S. enflata* in almost all the months of the year 1990, it is possible to conclude that this species is a continuous breeder with several peaks of intensive breeding. The presence of adults in 8 months in the central sector, 7 months in the northern sector and 5 months in the southern sector, in addition to the younger specimens may imply at least 6-8 broods in an year. This finding is in full agreement with the studies of Rao and Kelly (1962) who studied the breeding cycle of *S. enflata* off Waltair and concluded that this species breeds continuously over the year. Srinivasan (1976) also confirmed this view based on his studies of chaetognaths of the south-west coast of India.

Considering the seasonal abundance, the species of chaetognaths present in these collections off Vizhinjam area could be grouped under 4 categories.

1. Species present in all the three seasons, *viz.*, pre-monsoon (February-May), monsoon (June-August) and post-monsoon (September-January) with the dominant peaks either in pre-monsoon or post-monsoon months. *e.g. Sagitta enflata* and *S. neglecta.*
2. Species present only in the pre-monsoon and post-monsoon months. *e.g. S. bedoti* and *S. pacifica.*
3. Species present only during pre-monsoon period. *e.g. S. ferox* and *S. robusta.*
4. Species present only during post-monsoon period. *e.g. S. pulchra* and *Pterosagitta draco.*

This investigation on the seasonal fluctuations of the various species of chaetognaths shows that *S. enflata* and *S. neglecta* can tolerate wider fluctuations in temperature and salinity and hence they are present in all the seasons (Fig. 2). Species, such as *S. ferox, S. robusta* and *S. pacifica* are recorded only during the pre-monsoon period and late post-monsoon period when temperature and salinity were well above 28°C and 34‰ respectively and this indicates that these species have well defined periodicity.

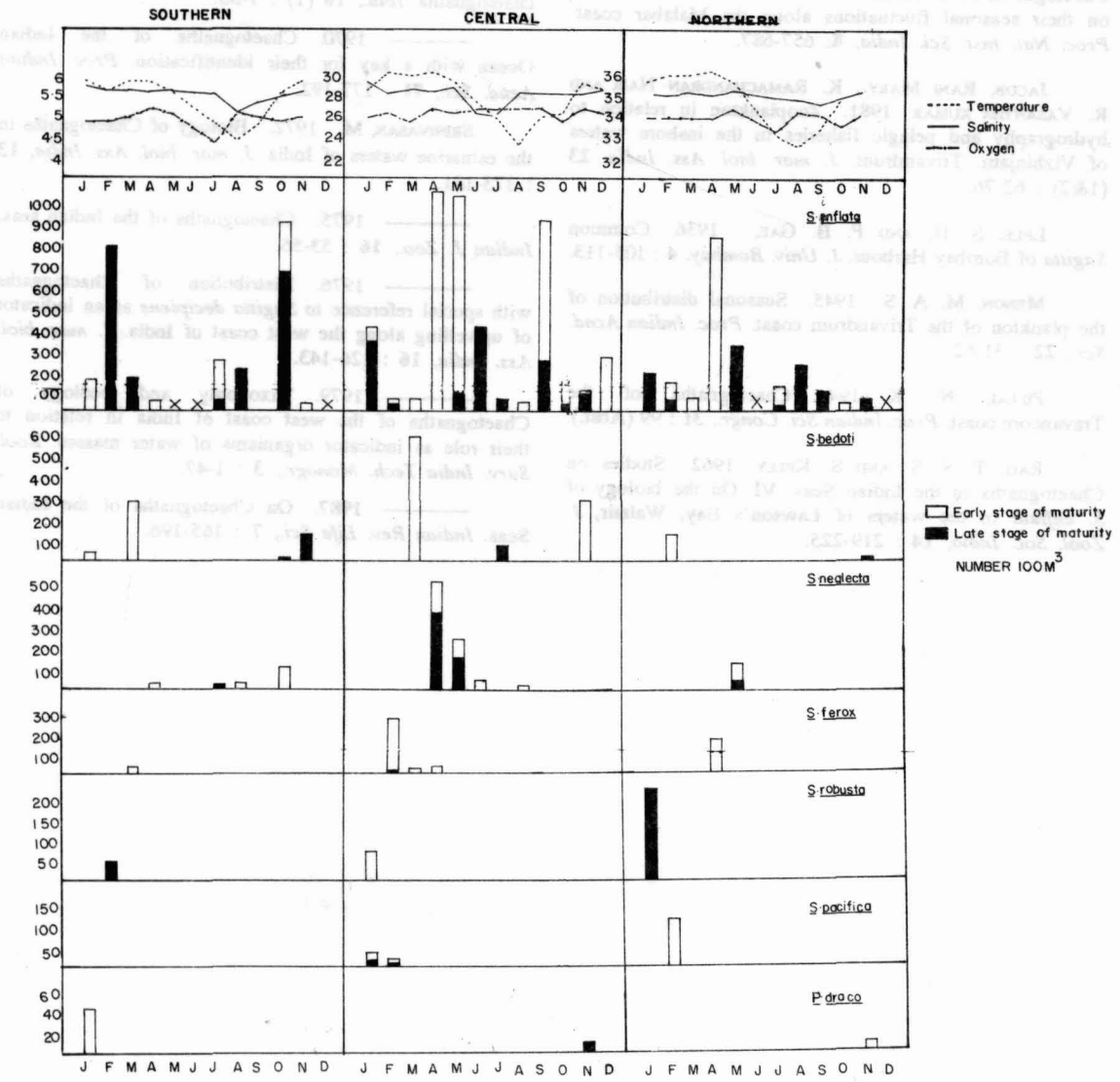

FIG. 2. *Seasonal abundance of the various species of Chaetognaths in relation to hydrographic conditions in the three sectors off Vizhinjam.*

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