

ON THE SEASONAL DISTRIBUTION OF SOME POLYCHAETES IN THE INDIAN OCEAN AREA ALONG 110° MERIDIAN

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ABSTRACT

Sagitella kowalevskii, *Typhloscolex mulleri* and *Lopadorhynchus henseni* are the three dominant species among the seventeen species of pelagic polychaetes recorded in the samples collected from an area off West Australia during International Indian Ocean Expedition. A majority of the species reach their peak abundance during April - August when the subtropical watermass occupies the central and southern parts of the region off West Australia. Many species are poorly represented in December - April, when the tropical watermass prevails in the northern parts. The species of tropical and sub tropical dominances are brought to light. The diurnal variation of *Typhloscolex leuckartii*, *Alciopina parasitica*, *Lopadorhynchus henseni* etc. are found to be more pronounced.

INTRODUCTION

Pelagic polychaetes form one of the major constituents of zooplankton and occur more commonly in the open ocean. Until recently our knowledge on the distribution of pelagic polychaetes was very meagre. The work carried out on the IIOE Collections has brought a fairly good knowledge about the distribution and relative abundance of this group in the Indian Ocean (Peter, 1972). However, the seasonal variation of pelagic polychaetes in different regions of the Indian Ocean has not been studied properly. So the

region along the meridian 110°E has been selected for the present study of the seasonal changes of these planktonic worms.

MATERIAL AND METHOD

In view of the zonal nature of the Indian Ocean a south-north section was chosen for the study - meridian 110°E by the Division of Fisheries and Oceanography, C. S. I. R. O. Cronulla in collaboration with the Oceanographic Laboratory Centre, O.R.S.T.O.M., New Caledonia. They undertook six seasonal biological cruises along this meridian between 32°S and 9°S (Fig. 1).

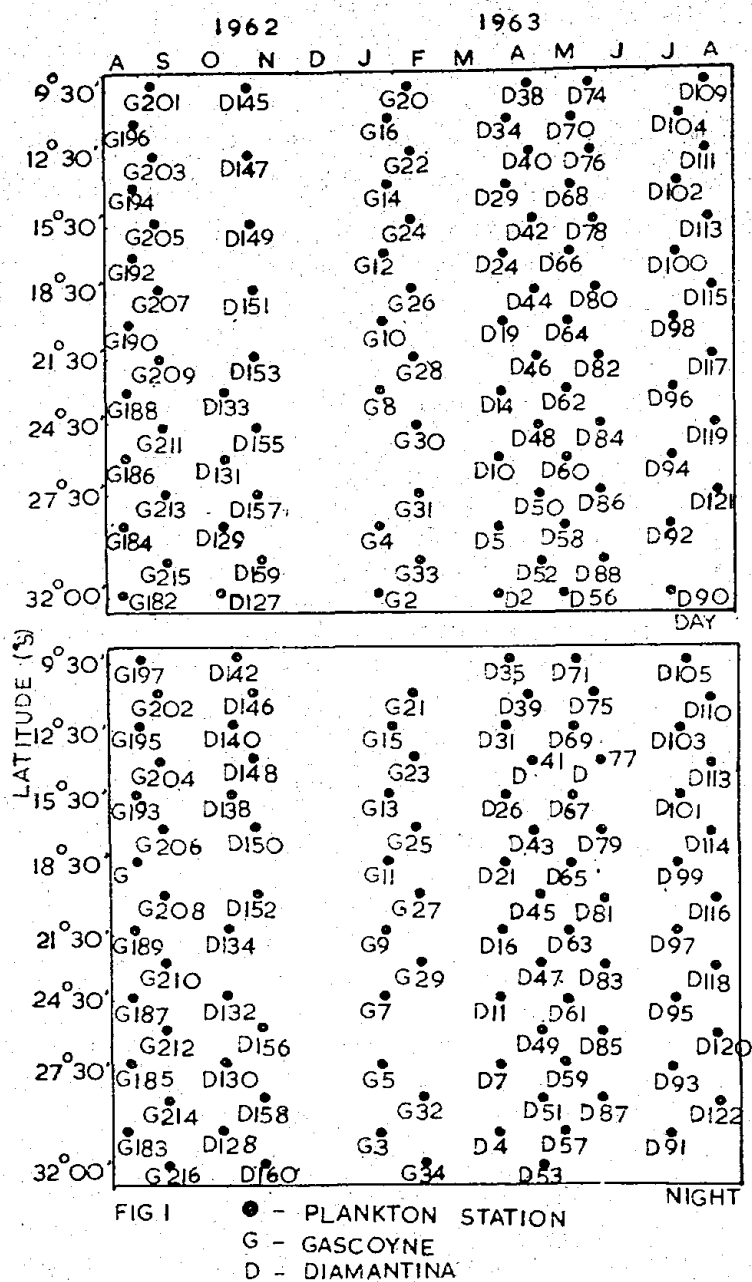


Fig. 1. Plankton stations of the six seasonal biological cruises of Gascoyne and Diamantina along the meridian 110°E between 32°S and 9°S.

This lay sufficiently close to the coast for logistic purposes, yet far enough west to penetrate the anti-cyclonic Indian Ocean gyre. This section ex-

tended far enough north to cross the South Equatorial current and south to enter the northern fringe of the West Wind Drift. Stations were at regular

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intervals in space and time. Each station was worked twice per cruise - on the way north and on the way south, one by night and one by day. Each cruise was conducted at two months' intervals starting from August, 1962 and ending in August, 1963. The zooplankton was collected by vertical hauls (200-0m) with the Indian Ocean Standard net (Currie, 1963). When the IOSN was lost during the cruises G4/62 and Dm4/62 Clarke Bumpus Sampler (Tranter, 1965) was used obliquely. The station list with sampling details are given in the oceanographical cruise reports (CSIRO, 1965a, 1965b, 1965c, 1965d, 1966a and 1966b). The duplicate samples which were sent to Indian Ocean Biological Centre were also utilized for the comparison of results.

The author had the privilege of analysing the sorted material of pelagic polychaetes sent to him by Dr. R. Hamond from C. S. I. R. O. for which he expresses his deep gratitude. The number of individual species present in each sample was estimated approximately to 200m³. The seasonal distribution charts for each species have been drawn.

Sagitella kowalevskii

Sagitella kowalevskii is one of the common species of this region with wide distribution in the tropical zones. However, the occurrence and abundance are restricted to a particular season. During December-April this species is either absent or sparsely represented especially in the northern part in the area north of 14°S (Fig. 2). During March-June this is totally not encountered in the north of 20°S. The areas of abundance fall in between 14°S and 31°S and mostly during July-August.

The highest density is observed in between 14°S and 23°S during night hours in July-August. The day and night variation in the population density is fairly distinguishable. The areas of high density during night are more widespread than day. The middle latitudes which are characteristics of mixing of two watermasses (tropical and subtropical) appears to provide a favourable environment for the flourishing of this species especially in July-November period.

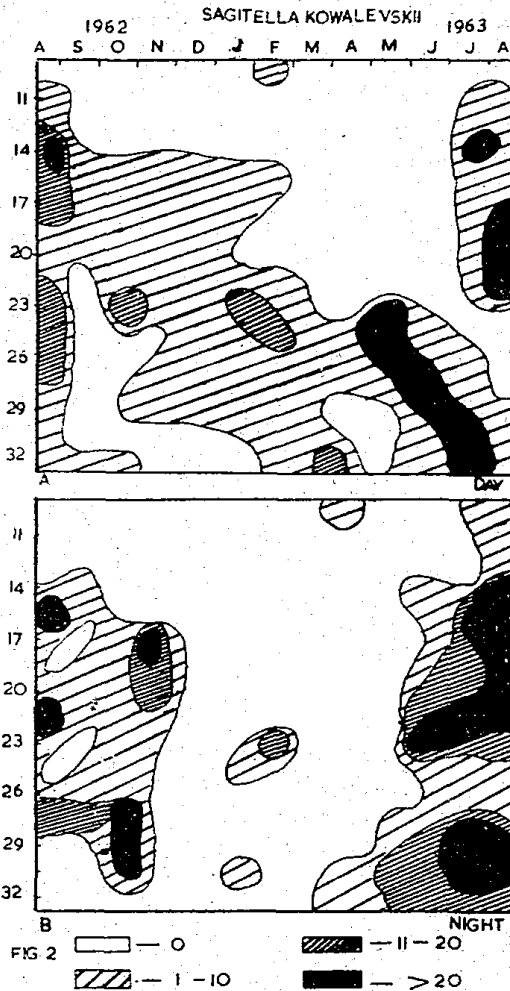


Fig. 2. Seasonal distribution of *Sagitella kowalevskii* in the 110°E.

Typhloscolex mulleri (Fig. 3)

This cosmopolitan species is sparse during September-March (Fig. 3). The common occurrence is noticed from May to August all along the meridian in between 9°S and 32°S and the areas around 29°S, 20°S and 11°S are more densely populated. The highest density is observed only around 11°S during June-August. The diurnal variation shows that the areas of moderate to high density are slightly more widespread during night.

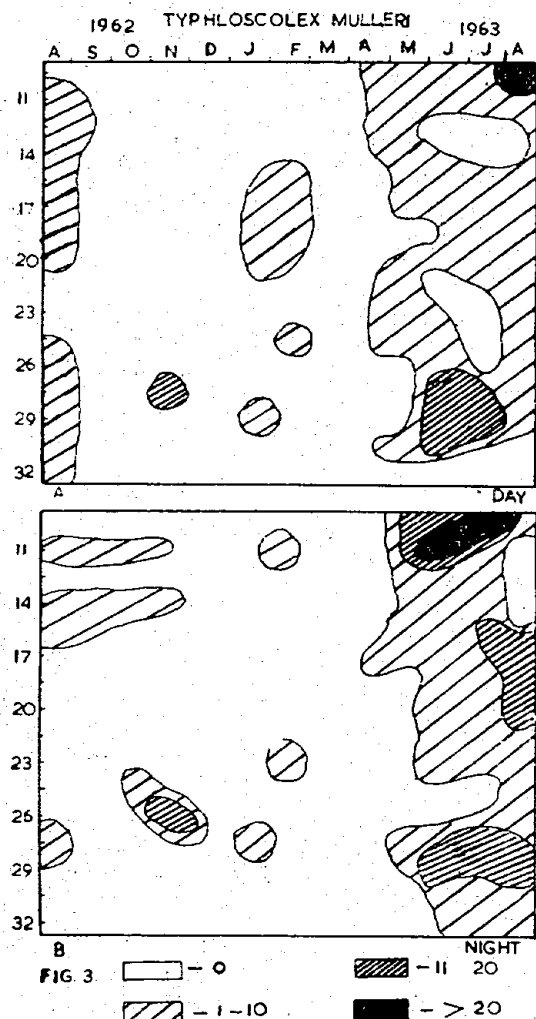


Fig. 3. Seasonal distribution of *Typhloscolex mulleri* in the 110°E.

Lopadorhynchus henseni (Fig. 4).

This species is widely distributed with more common occurrence in the central latitudes. The northern part (north of 14°S) and the southern part (south of 26°S) are sparsely populated. The moderate to high density areas fall in the central zone with the highest density in between 20°S and 23°S during August-September. The diurnal variation is remarkable in this species, the occurrence during night being more widespread with greater abundance.

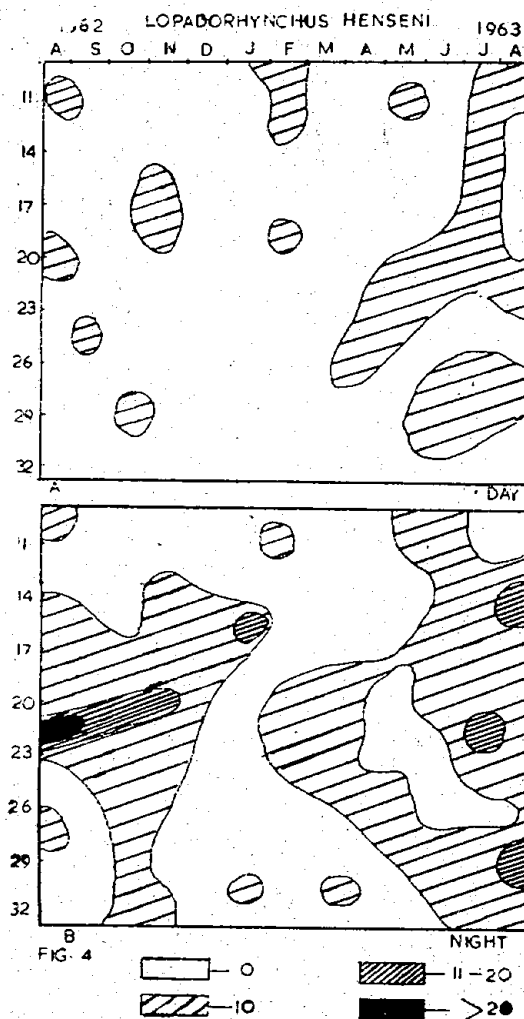


Fig. 4. Seasonal distribution of *Lopadorhynchus henseni* in the 110°E.

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Typhloscolex leuckartii (Fig. 5)

There are only 13 records of this species and 8 of them are in the area north of 20°S. However the distribution appears to be cosmopolitan. The species is more common in April-August. More than 50% of the records are during April-May. The diurnal variation is not pronounced. *Travisiopsis lanceolata* (Fig. 5) is recorded only twice at 26°S in August and November.

Alciopina parasitica (Fig. 6)

About two-third of total occurrence of this species fall in the south of 20°S, most of them occurring in April-August. The diurnal variation is pronounced; of the total 24 records 15 are in the night.

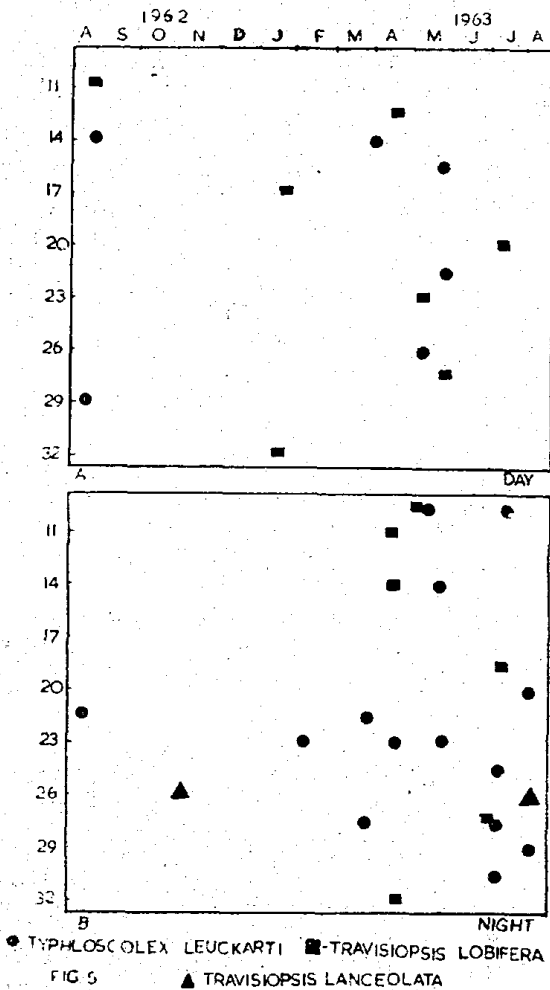


Fig. 5. Seasonal distribution of *Typhloscolex leuckartii* and *Travisiopsis lanceolata* in the 110°E.

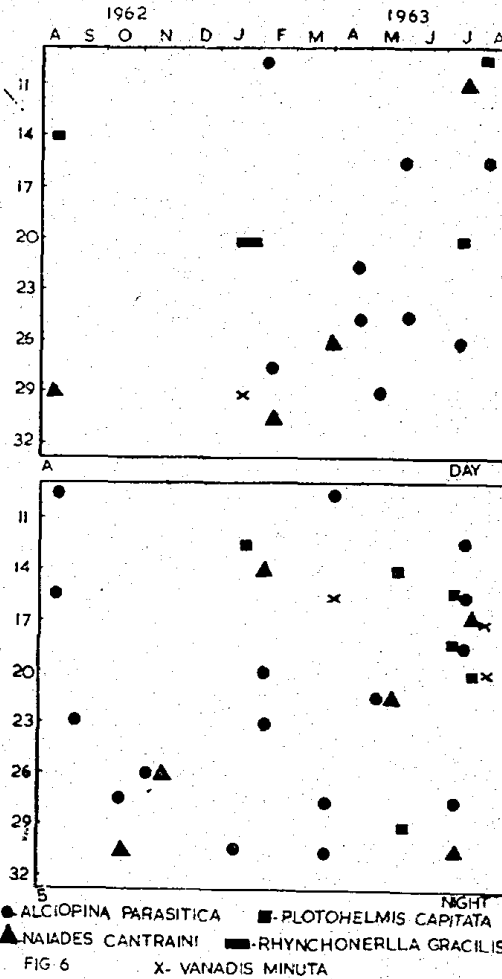


Fig. 6. Seasonal distribution of *Alciopina parasitica*, *Plotohelmis capitata*, *Naiades cantrainii*, *Vanadis minuta* and *Rhynchonerella gracilis* in the 110°E.

Plotohelmis capitata (Fig. 6)

This tropical species has its dominance in the north of 20°S and very rarely present in the subtropical waters. Out of nine records eight are in the north of 20°S. It is commonly met with in the months of June-August. The diurnal variation is distinct with 6 records in the night hauls and 3 in the day.

Naiades cantrainii (Fig. 6)

There are only ten records of this species and 7 of them are in the south of 20°S. The seasonal and diurnal variation in occurrence is less pronounced.

Vanadis minuta (Fig. 6)

This is a rare species. Only four specimens are recorded and three of them in north of 20°S during April - August in the night.

Rhynchonerella gracilis (Fig. 6)

Only one specimen is recorded at 20°S in January.

Pelagobia longicirrata (Fig. 7)

This cosmopolitan species occurs all along the meridian with more common occurrence during April - August. The number of records during day are more than that of night.

Phalacrophorus uniformis (Fig. 7)

This species occurs predominantly in tropical waters. Of a total of 10 records 9 are in the north of 20°S and all of them during April - August. There are equal number of records in day and night.

Pedinosoma curtum (Fig. 7) occurs only in one station at 23°S in August.

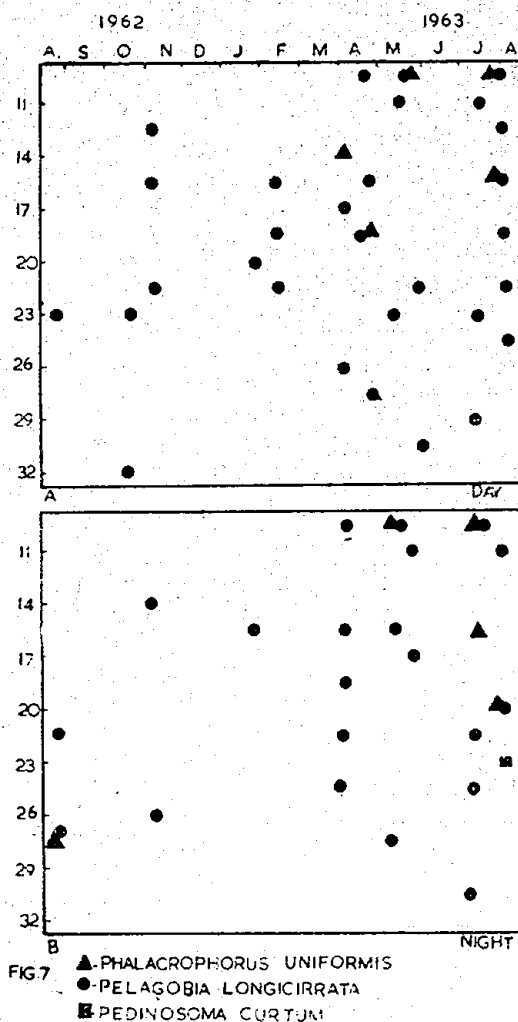


Fig. 7. Seasonal distribution of *Pelagobia longicirrata*, *Phalacrophorus uniformis* and *Pedinosoma curtum* in the 110°E.

Lopadorhynchus nationalis (Fig. 8)

This has cosmopolitan distribution with predominant occurrence in between 14°S and 23°S. Unlike a majority of the species of pelagic polychaetes this species is less common during June-November, commonly occurring in April-May. The diurnal variation is pronounced with 63% of occurrence in the night.

Lopadorhynchus uncinatus (Fig. 8)

DISCUSSION

There are only seven records of this species and four of them are from south of 23°S. Most of the records are during April-May in the night hours.

Lopadorhynchus indica (Fig. 8)

Occurs only in four collections and three of them are from north of 17°S in January, February and August during day.

From the overall distribution of pelagic polychaetes it is difficult to derive any distinct pattern as most of the species have cosmopolitan distribution. However, from the dominant occurrence and abundance of certain species a few general conclusions may be drawn.

In the eastern Indian Ocean there is a layer of warm water bounded below by a permanent thermal discontinuity. This layer is deepest in the subtropics extending upto 300 meters and in lower latitudes upto 100 metres. Because of this convexity there is a rich supply of nutrients immediately beneath the tropical euphotic layer and far beneath the subtropical euphotic layer (Wyrtki, 1973). The boundary between the tropical and subtropical zones lies near latitude 18°S. The species like *Typhloscolex mulleri*, *Plotohelms capitata* and *Phalacrophorus uniformis* have their dominance in the tropical waters off the north west Australia. South of this, a shallow thermocline (25-75m) develops in late summer dividing the mixed layer into an upper and a lower stratum. The subtropical area is essentially the eastern part of a large anti-cyclonic gyre and within this gyre surface waters converge and sink. To the north and to the south, surface waters diverge and upwelling tends to occur. The species like *Typhloscolex leuckarti*, *Alciopina parasitica*, *Lopadorhynchus uncinatus* and *Naiades cantrainii* occur predominantly in this subtropical region. *Sagitella kowalevskii* shows its dominance in the subtropical and mixed waters. *Pelagobia longicirraia*,

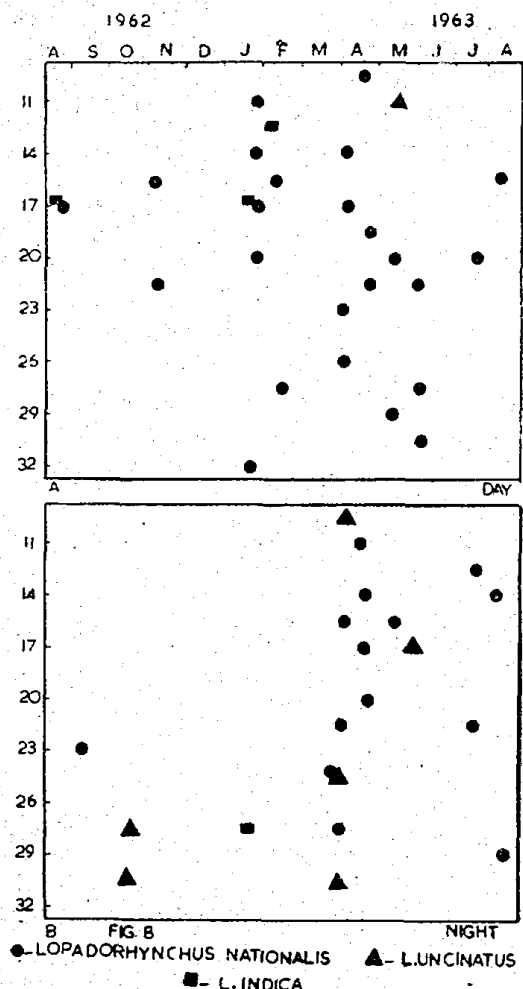


Fig. 8. Seasonal distribution of *Lopadorhynchus nationalis*, *L. uncinatus* and *L. indica* in the 110°E:

Lopadorhynchus nationalis and *Travisio-
psis lobifera* are cosmopolitan in distri-
bution.

As the eastern Indian Ocean region is subjected to the influence of two watermasses and the boundaries of these watermasses change from season to season, there is considerable change of mixing in the central part. In early summer (November) the high salinity water drifts along 110°E to about 15°S. By autumn (March-April) this water is pushed to the south (south of 20°S) and replaced by low salinity tropical water (Rochford, 1969). A majority

of species of pelagic polychaetes reach their peak abundance during April - August. It appears that sub tropical watermasses which prevails during this period play a vital role in the distribution of pelagic polychaetes.

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