

Seasonal occurrence of distribution and diversity of Polychaete in Nagapattinam coastal water, Southeast coast of India

R. Balasubramanian

Centre of Advanced Study in Marine Biology, Faculty of Marine Sciences, Annamalai University,
Parangipettai – 608 502 Tamil Nadu, India
balaram_r2@rediffmail.com

Abstract

Background/Objectives: Tropical coastal areas are characterized by dynamic seascapes which encompass interconnected ecosystems such as wet land, mangroves, sea grass beds and corals. These ecosystems provides are highly productive, aquatic and terrestrial biodiversity as well as for the functioning of economic sectors such as tourism and fisheries. The near shore waters are exhibiting the seasonal variations. Fresh water inflow is influence the nutrient cycle in environments.

Methods/Statistical analysis: The sediment samples was collected in Nagapattinam coastal waters from July' 2016 – June 2017 to collect the polychaete and analyze the species distribution.

Findings: The total numbers (nos) of 80123 nos/ m² were distributed in this station. The total numbers of 42 polychaete species were recorded during the study period. All the 42 species were recorded in summer and minimum of 21 species were recorded at monsoon. Among them 9 species of polychaetes (*Capitella capitata*, *Nereis virens*, *Polydora ciliata*, *Perinereis cultrifera*, *Eunice tentaculata*, *Terebellides stroemi*, *Amphinome rostrata*, *Syllis gracilis* and *Glycera alba*) were dominated in all seasons.

Application/Improvements: Benthic macrofauna play an important role in the coastal ecosystems such as scavenging, biological indicator, nourishment and nutraceutical values for fin and shell fishes. Among this, the Polychaetes are predominant group among the macro-benthic forms. They are also often used as live feed for aquaculture industry and also bio-prospecting.

Keywords: Sediments, Polychaetes, Distribution, Diversity, Season.

1. Introduction

Benthic zone and its dwelling organisms are more important to the ecosystem of any water body. They are great indicators of any changes that occur in the area. Specific species or species types can show the information on the status of the benthic environment [1].

Benthos plays an important role in the aquatic marine ecosystem because of their importance in the marine food chain. Structural changes of marine benthic communities may be caused by different disturbances such as organic enrichment and physical forces [1], [2].

Polychaetes are traditionally separated into two orders, Errantia and Sedentaria, on the basis of development of the anterior end and the life habits of the species. Several attempts were made to subdivide the polychaetes with various system proposed by structure and habits [1], [3].

They are play vital role for coastal environs. Extensive use of polychaetes is as biological indicators of various degrees of marine pollution [3], [4]. The variety and abundance of species t can often be used as an indication of the cleanliness of the environs [5], [6]. Hence the present study has been carried out the collection and identification of polychaetes along with distribution and diversity in Nagapattinam coastal waters.

2. Study area

Nagapattinam (Lat. 10046N. Long.79051E) is a coastal area and it is situated in the Bay of Bengal. It is also consider as one among the important fishing harbor in Tamil Nadu coast.

3. Materials and Methods

1. Sediment samples for collection of polychaetes

Sediment was collected from Nagapattinam coast for the period one year (July' 2016 – Decr.'2017) (Figure 1). Three replicate samples were collected from this study area and using Peterson grab (0.0256m²) and gently sieved 0.5mm mesh. The organisms retained by the sieve and the specimens were preserved with 5% formalin. The preserved animals were identified to species level with the available literatures [5].



4. Results

1. Polychaete distribution

The total numbers (nos) of 80123 nos/ m² were distributed in this station. The minimum numbers of 9773nos/m² were distributed in monsoon (Dec.' 2016) and maximum of 18669 nos/ m² were observed in summer (Figure 2).

2. Species diversity

The total numbers of 42 polychaete species were recorded during the study period in this station. The diversity of polychaete species, minimum (21 species) were noticed during monsoon and all species (42 species) were found in summer (Figure 3). Among them 9 polychaete species (*Capitella capitata*, *Nereis virens*, *Polydora ciliata*, *Perinereis cultrifera*, *Euchone rosea*, *Terebellides stroemi*, *Nephtys dibranchis*, *Amphinome rostrata*, and *Glycera alba*) were dominated in all the four seasons.

Figure 2. Monthly distribution (Nos/m²) of polychaetes in Nagapattinam coastal waters during Jul'2016 -Jun' 2017

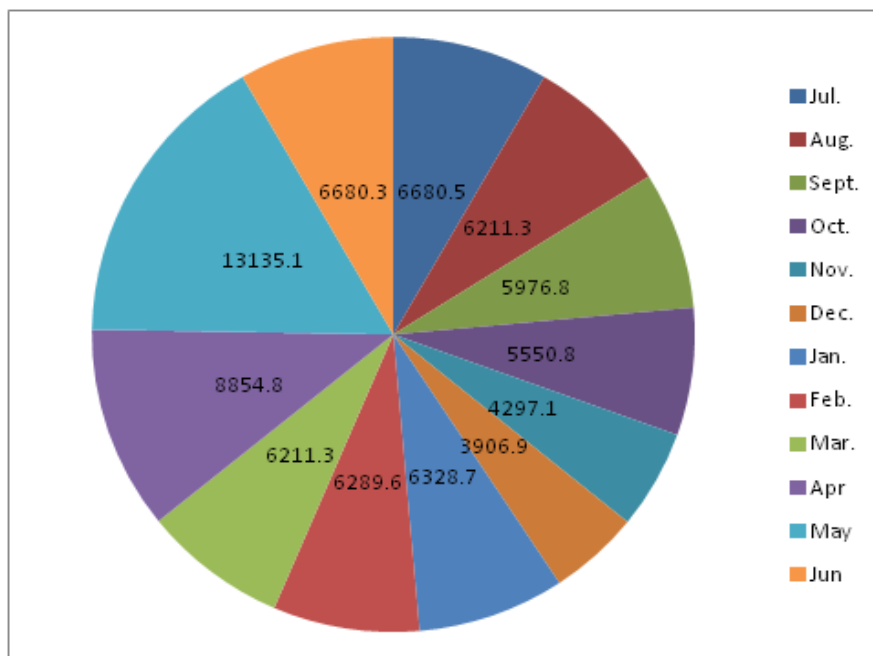
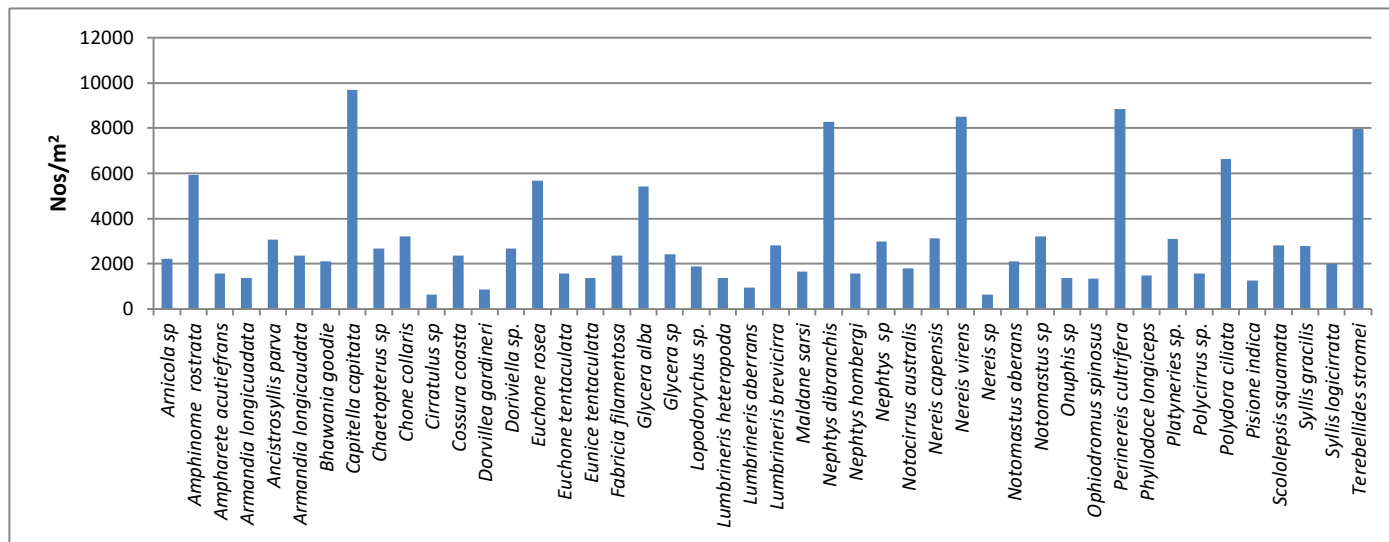


Figure 3. Annual distribution (Nos/m²) of polychaete species during July'2016 -June' 2017 in Nagapattinam coastal waters



5. Discussion

This population is depending on environmental factors, which are directly or indirectly influence the survival of polychaetes. It is suggested that the study involving to assessment of physic-chemical factors along with the population estimation of polychaetes would provide a clear picture of the survival strategies in this ecosystem [7], [1], [8]. Total number of 42 species was recorded in this station. All the 42 species were observed in summer. Minimum number of 21 species was recorded in monsoon. Among them, 9 species of polychaetes (*Capitella capitata*, *Neries viren*, *Polydora ciliate*, *Perneries cultrifera*, *Eunice tentaculata*, *Teribellides stroemi*, *Amphinome rostrata*, *Syllis gracilis* and *Glycera alba*) dominated in all the seasons.

The factors, as sediment types, salinity regimes, organic content, microbial association and food availability are greatly influenced the number of species composition [4], [9], [2]. Most of the polychaetes were distributed in upper superficial layer (0-5cm). This observation was agreement with other reports [8], [9]. The reason of dominance of these species might be due to their tolerance against fluctuations.

In the present study, the noticeable seasonal variations in the polychaetes community were observed in the study area. Similar changes noticed earlier [10], [5], [11]. Benthos are directly or indirectly involved in most physical and chemical processes which are mainly influenced by the characteristic of the sea bottom, overlying waters, exchange of substances to sediments [7], [8].

6. Conclusion

Polychaetes are considered as a secondary producer and also important link between primary producers and higher tropic levels in benthic systems. Even its contributions are very high in the aquatic environment particularly for assessing the health of marine environment; it has been widely accepted while very limited works are available on distribution and diversity of marine polychaetes. Hence, the present study demonstrated about the polychaete distribution in Nagapattinam coast.

7. References

1. K. Fauchald. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series*. 1977; 28, 1-188.
2. A. Somaschini, M.F. Gravina, G.D. Ardizzone. Polychaete depth distribution in a *Posidonia oceanica* bed (rhizome and matte strata) and neighbouring soft and hard bottoms. *P.S.Z.N.I: Marine Ecology*. 1994; 15(2), 133-151.
3. A.A. Karande. Use of epifaunal communities in pollution monitoring. *Journal of Environmental Biology*. 1991; 191-200.
4. S.B. Choudhury, R.C. Panigrahy. Seasonal distribution and behavior of nutrients in the Greek and coastal waters of Gopalpur, East coast of India: *Mahasagar-Bull. Nati. Inst. Oeanogr*. 1991; 24(2), 91-88.
5. P. Fauvel. The fauna of India including Pakistan, Ceylon, Burma and Malaya. The Indian press, Allahabad. *Annelida*. 1953; 1-507.
6. T.H. Pearson, R. Rosenberg. Macrobenthic succession in relation to organic enrichment and pollution of the marine environment. *Oceanography and Marine Biology - An Annual Review*. 1978; 16, 229-311.
7. K.A. Dafforn, B.P. Kelaher, S.L. Simpson, M.A. Colema, P.A. Hutchings. Polychaete richness and abundance enhanced in anthropogenically modified estuaries despite high concentrations of toxic contaminants. *PLoS One*. 2013; 8(9), 1-10.
8. R. Sunilkumar. Biomass, horizontal zonation and vertical stratification of polychaete fauna in the littoral sediment of Cochin estuarine mangrove habitat, south west coast of India. *Indian Journal of Marine Science*. 2002; 31(2), 100-107.
9. A. Willsie. Zonation de la macrofaune endogee de la matte d'herbier de *Posidonia oceanica* (L.) Delile. *Rapp. Comm. int. Mer Medit*. 1983; 28(3), 165-168.
10. R.M. Anbuhezian, S. Ravichandran, P. Murugesan, J.S. Serebiah. Assessment of soft bottom polychaetes diversity in Thondi, Palk bay, India. *Journal of Environmental Biology*. 2012; 33, 917-921.
11. C. Fraser, P. Hutchings, J. Williamson. Long-term changes in polychaete assemblages of Botany Bay (NSW, Australia) following a dredging event. *Marine Pollution Bulletin*. 2006; 52, 997-1010.

The Publication fee is defrayed by Indian Society for Education and Environment (www.iseeadyar.org)

Cite this article as:

R. Balasubramanian. Seasonal occurrence of distribution and diversity of Polychaete in Nagapattinam coastal water, Southeast coast of India. *Indian Journal of Innovation and Development*. Vol 6 (9), September 2017