

Distribution of polychaete species in Uppanar estuary, southeast coast of India

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Abstract

Background/Objectives: Macrobenthos are of special interest because of them are sessile or have a limited mobility and thus directly depend on environment conditions. They are showing marked response to environmental changes depending on their specific sensitivity and tolerance level. Among the macrobenthic forms, the polychaetes are dominant group which are important food source for higher trophic levels of most estuarine and near shore environment.

Methods/Statistical Analysis: Sediment samples were collected from Uppanar estuary, Cuddalore coast for a period of one year from Jan' 2011 – Dec' 2011 to collect and analyze the distribution and diversity of polychaete species during the study period.

Findings: The distribution and diversity of polychaete species, the total numbers of 36 species were recorded belonging to 19 families during the study period in this station. The maximum 32 species of polychaetes were recorded in summer and minimum of 23 species were recorded at monsoon. Among them five species of polychaetes (*Capitella capitata*, *Nereis virens*, *Polydora ciliata*, *Perinereis cultrifera* and *Glycera Alba*) were dominated in all the seasons.

Application/Improvements: They are playing an important role in ecosystem process such as nutrient cycling, pollutant metabolism and dispersion. They are also considering as an important secondary production of among the macrobenthos. Polychaetes are also play a important role of pollution indicator.

Keyword: Uppanar estuary, Sediments, Polychaete species, Distribution, Diversity.

1. Introduction

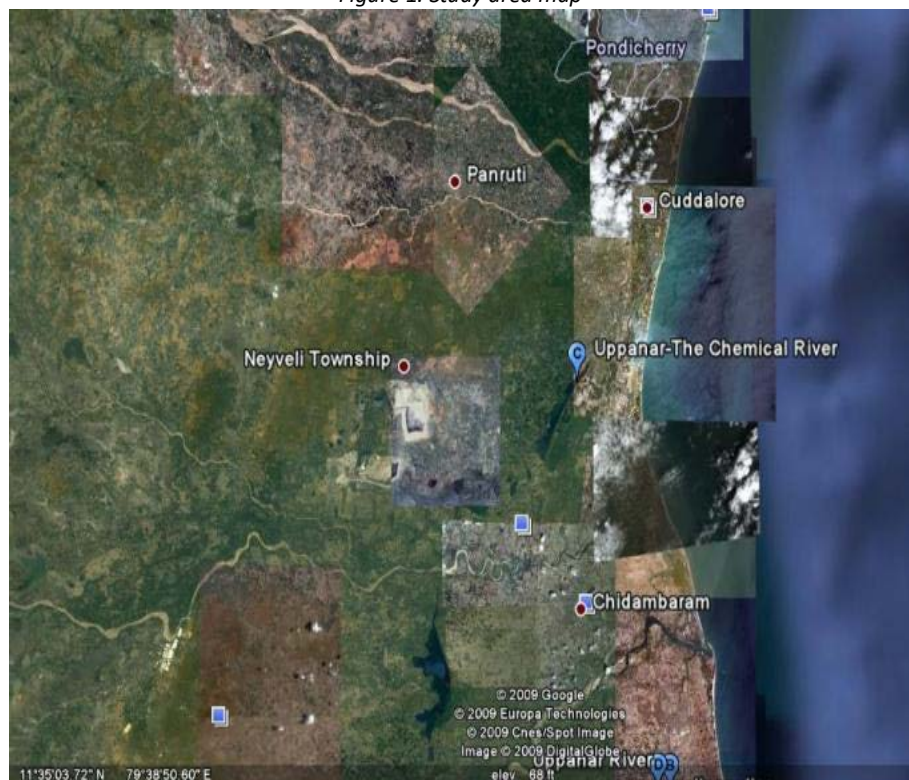
The environmental conditions such as topography, water movement and stratification, salinity, oxygen, temperature and nutrients are characterizing particular water mass and also they determine the composition of its biota [1]. Usually in the near shore waters and estuaries, they exhibit considerable seasonal variations depending on the local conditions of rainfall, tidal incursions, various a biotic and biotic processes, quantum of fresh water inflow affecting the nutrient cycle of different coastal environments [2]. They exhibit variety of body shapes, feeding style, reproductive modes and form a link in the marine food web. Polychaetes consume decomposed organic matter (bacteria, planktonic and benthic organisms, detritus etc.) and in turn act as food for many bottom feeding fishes, birds, and other marine invertebrates. Hence, the studies have become inevitable to know the potentiality and also for better management of an aquatic ecosystem. Macro-fauna are key components in the functioning of soft bottom coastal marine systems [3].

Macro-fauna in marine sediments play an important role in ecosystem processes such as burial and dispersion off secondary production, nutrient cycling in general, and the metabolism of pollutants. They also change physical and chemical parameters of sediments, particularly those close to the sediment-water-column interface. They, in turn, show a close relationship to organic content, food availability in general, and grain size [4]. Deposit-feeders inhabiting the sediment are dependent on settled organic matter that may originate from primary producers but increasingly also from anthropogenic input [5],[6], [7]. Moreover, individual faunistic groups or single species may show different patterns of distribution and abundance at increasing spatial complexity of the habitat [8]. Hence, the present study has been carried out on the collection and identification of polychaetes from the Uppanar estuary, Cuddalore coast.

2. Study area

The Uppanar estuary is situated at Cuddalore (Lat.11° 43' N, Long. 79° 46' E). This river flows and joins with the Bay of Bengal by the mouth of Gadilam River. It is a tributary of Gadilam River which originates from the foot hills of north-east part of the Shervaroyan hills and runs along the distance of 95 km and joins the adjoining Paravanar estuary forming Uppanar – Paravanar estuarine complex as shown in Figure 1.

Figure 1. Study area map



3. Materials and Methods

1. Collection of sediment samples

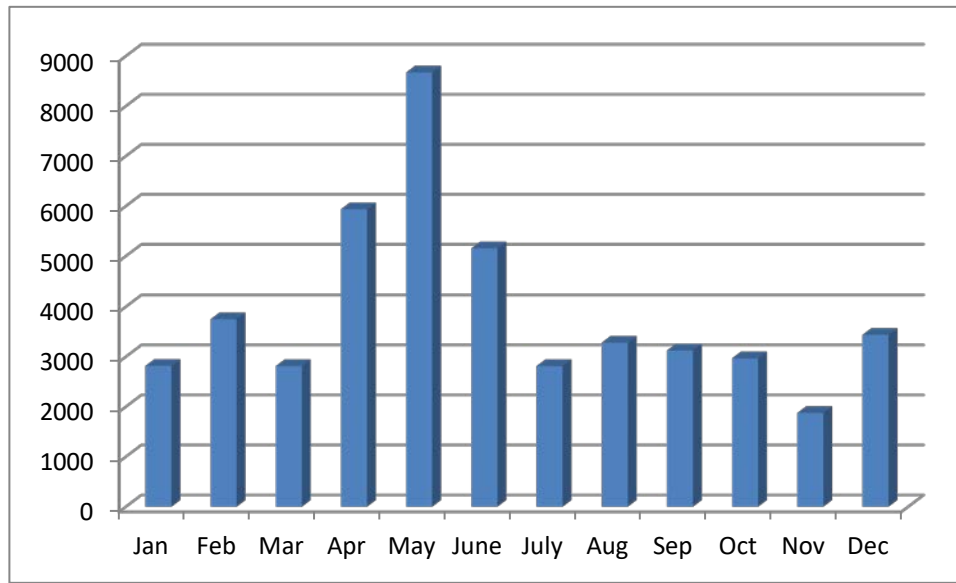
Samples were collected at Uppanar estuary during every month from January 2011-December 2011. Three replicates sediment samples were taken from this study area and using Peterson Grap (0.0256 M²) and gently sieved 0.5mm mesh. The organism retained by the sieve and the specimens which is preserved by 5% neutralized formalin. The preserved organisms were identified to species level with the available literature [9], [10] and counted the specimens using binocular microscope.

4. Results

1. Distribution

The total number of 46644 Nos/m² of polychaete distribution was recorded in this station. The minimum distribution (1875 Nos/m²) were found in monsoon (Dec' 2011) and maximum number of polychaetes 8672 Nos/m² were found in the month of May' 2011 (summer) (Figure 2).

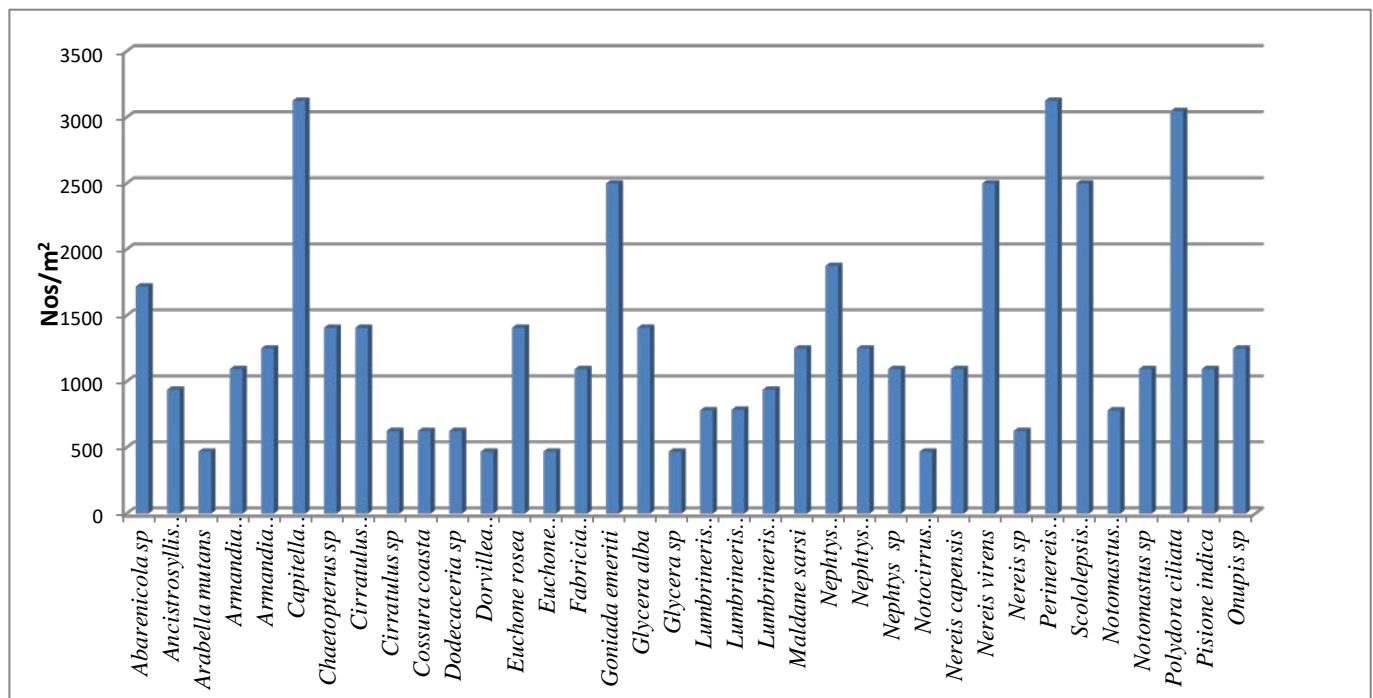
Figure 2. Distribution of polychaetes in Uppanar estuary during the January- 2011 to December-2011



2. Species diversity

The total numbers of 36 species were recorded during the study period in this station. Diversity of these species 30, 32, 25, and 23 in post-monsoon, summer, pre-monsoon and monsoon were observed respectively. The maximum 32 species were recorded in summer and minimum of 23 species were recorded at monsoon. Among these species, *Capitella capitata*, *Glycera alba*, *Nephtys dibranchis*, *Neries viren*, *perineris cultrifera*, *polydora ciliata* and *Scololepis squamata* were dominated in all seasons (Figure 3).

Figure 3. Species composition of polychaetes in Uppanar estuary during the January- 2011 to December-2011



5. Discussion

The 36 species of polychaetes were recorded during the study period. The maximum of 32 species of polychaetes were recorded during summer and minimum 23 species of polychaetes were recorded during monsoon. Among them five species of polychaetes (*Capitella capitata*, *Nereis virens*, *Polydora ciliata*, *Perinereis cultrifera* and *Glycera alba*) were dominated in all the seasons.

The polychaetes are mainly composed by typical infaunal organisms and also interstitial forms. They are commonly richer and more diversified due to the environmental factors. In the present study was observed totally thirty six species of polychaetes in the sampling station. Among these a certain species viz., *Capitella capitata*, *Perinereis cultrifera*, *Nereis virens*, *Glycera alba* and *Polydora ciliata* were found to be predominant (Table-1). Most of the polychaetes were distributed in upper superficial layer (0-5cm). This observation was agreement with other reports [11], [12].

The maximum of thirty two species of polychaetes were recorded during summer and minimum twenty three species of polychaetes were recorded during monsoon. Among this five species of polychaetes (*Capitella capitata*, *Nereis virens*, *Polydora ciliata*, *Perinereis cultrifera* and *Glycera alba*) were found to be dominated in all the seasons. 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 [13], [14], [15]. Benthos are directly or indirectly involved in most physical and chemical processes that occur in the Uppanar estuaries and they are mainly influenced by the characteristic of the sea bottom, overlying waters, the exchange of substances between sediments and finally by the other members of their community [16-19].

6. Conclusion

The use of polychaetes taxon for assessing the health of marine environment has been widely accepted and was successfully demonstrated in the present study.

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