

A CHECKLIST OF POLYCHAETE SPECIES SOME MANGROVES OF ASIA

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Abstract

Altogether 87 species of polychaetes belonging to 17 families and 43 genera have been listed from mangrove littoral soil of some Asian countries. Paucity of taxonomic studies on infaunal polychaete worms in vast mangrove areas covering 76,82,335 hectares in Asia may virtually reflect on the reduction in the diversity and richness of the species so far listed. Members of the family Nereidae and Eunicidae were found to be higher followed by Glyceridae, Spionidae and Capitellidae. India occupies the first position in biodiversity of polychaete fauna followed by Thailand, Malaysia and Japan based on the limited availability of authentic studies.

Keywords

Mangroves, Asia, polychaetes, checklist, India, Thailand, Malaysia, Japan

Introduction

Mangroves are characteristic coastal forest ecosystems of the tropical and subtropical regions of the world. In Asia, large mangrove formations are mainly found in Indonesia, Malaysia, Myanmar, Bangladesh, Philippines, Vietnam (south), India, Thailand, Pakistan and Sri Lanka in the order of its luxuriant growth. A total of 76,82,335 hectares of mangroves (Anno, 1992) are found in these countries including other Asian countries where the mangrove formations are comparatively lower in comparison to the former ten countries. It has been reported that about 1829 species of organisms belonging to various taxonomic groups including higher plants occur in Asian mangroves (Saenger *et al.*, 1983). The fauna associated with mangroves include the protozoans to the highly organized mammals. However, only 11 species of polychaete worms of the phylum Annelida have been listed from Asia (Saenger *et al.*, 1983). Polychaetes are one of the most important taxonomic groups in littoral mangrove soil and this negligible number of species surely reflects the inadequacy of extensive survey on

polychaetes in the vast areas of Asian mangroves as well as their taxonomic studies. At the same time, lack of literature regarding the occurrence and distribution of polychaete fauna from mangroves of Asian countries may also reduce their species diversity to 11 as mentioned above. It is interesting to note here that Indian mangrove habitats alone have a total of 62 species of polychaetes belonging to 35 genera (Kumar, 2001). In this context, an attempt is made here to list the species richness and diversity of soil-dwelling polychaete fauna based on the available authentic reports from some Asian countries. Occurrence and distribution of polychaetes is available only from Malaysia (Sasekumar, 1974), Thailand (Frith *et al.*, 1976), Japan (Omori, 1989) and India (Kumar, 2001). This is an attempt to analyse polychaete richness and diversity based on these works. This comparative analysis also outlines the similarity of polychaetes among these Asian countries and their significance to the zoogeographic distribution in mangroves.

Result and Discussion

Species composition

List of polychaetes in some Asian countries is given in Table 1. All these species were collected from intertidal mangrove soil and the methodology adopted by different workers was almost same; soil samples were collected and sieved to separate polychaetes. Altogether 87 species have been listed, they are given in the order of maximum diversity of species of each family in Table 1. Species are also categorized into Errantia and Sedentaria groups based on their mobility, the former group being more active in burrowing than the latter. Of the six families of Errantia, Nereidae (24 species), Eunicidae (20 species) and Glyceridae (8 species) include high richness and diversity of species than the other three families. The Sedentaria consists of eleven families and between this the Capitellidae (7 species) and Spionidae (7 species) showed comparatively high diversity and richness.

Diversity of polychaetes

The catalogue of Indian mangrove polychaetes consists of a maximum of 62 species and this demarcation compared to other

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Table 1. Polychaete fauna in mangroves of some Asian countries.

Scientific name	India	Malaysia	Thailand	Japan	Scientific name	India	Malaysia	Thailand	Japan
Errantia group					<i>Lumbriconereis notocirrata</i> (Fauvel)	+			
Nereidae					<i>Lumbriconereis polydesma</i> (Southern)	+			
<i>Ceratonereis coasta</i> Grube	+				<i>Lumbriconereis pseudobifilaris</i> Fauvel	+			
<i>Ceratonereis erythraeensis</i> Fauvel			+		<i>Lumbriconereis simplex</i> Southern	+			
<i>Ceratonereis</i> sp.				+	<i>Lumbriconereis</i> sp.	+			
<i>Dendronereis aestuarina</i> Southern	+				<i>Marphysa gravelyi</i> Southern	+			
<i>Dendronereis arborifera</i> Peters	+		+		<i>Marphysa macintoshi</i> Crossland	+			
<i>Dendronereis</i> sp.		+			<i>Marphysa mossambica</i> (Peters)	+		+	
<i>Dendronereides heteropoda</i> Southern	+				<i>Marphysa stragulum</i> (Grube)	+			
<i>Lycastis indica</i> Southern	+				<i>Onuphis</i> sp.			+	
<i>Lycastonereis indica</i> Rao	+				Glyceridae				
<i>Namalycastis indica</i> (Southern)	+				<i>Glycera alba</i> Rathke	+			
<i>Nereis capensis</i> Willey		+			<i>Glycera convoluta</i>	+			
<i>Nereis chilkaensis</i> Southern	+				<i>Glycera longipinnis</i> Grube	+			
<i>Nereis chingrighattensis</i> Fauvel	+		+		<i>Glycera rouxii</i> Audouin & Milne-Edwards	+			
<i>Nereis cricognatha</i> Ehlers	+				<i>Glycera tessellata</i> Grube		+		
<i>Nereis falsa</i> Quatrefages			+		<i>Goniada incerta</i> Fauvel	+			
<i>Nereis glandicincta</i> Southern	+				<i>Goniada emerita</i> Audouin & Mile-Edwards	+			
<i>Nereis kauderni</i> Fauvel	+				<i>Goniada</i> sp.	+			
<i>Nereis</i> spp.	+				Phyllodocidae				
<i>Perinereis aibuhitensis</i> Grube			+		<i>Eteone picta</i> Quatrefages			+	
<i>Perinereis cavifrons</i> (Ehlers)	+				<i>Eteone barantollae</i> Fauvel	+			
<i>Perinereis nigropunctata</i> Horst	+				<i>Phyllodoce madeirensis</i> Langerhas	+			
<i>Perinereis nuntia</i> (Savigny)			+		<i>Phyllodoce</i> sp.	+			
<i>Perinereis vancaurica</i> (Ehlers)			+		Hesionidae				
<i>Perinereis</i> sp.	+				<i>Ancistrosyllus constricta</i> Southern	+			
Eunicidae					<i>Talehsapia annandalei</i> Fauvel	+			
<i>Arabella iricolor</i> (Montagu)			+		Aphroditidae				
<i>Diopatra monroi</i> Day			+		<i>Lepidonotus kumari</i> Rullier		+	+	
<i>Diopatra neapolitana</i> Delle chiaje	+	+	+		<i>Lepidonotus tenuisetosus</i> (Gravier)	+			
<i>Diopatra cuprea</i> (Bosc)	+				Sedentaria group				
<i>Drilonereis filum</i> Claparede			+		Capitellidae				
<i>Eunice tubifex</i> Crossland	+				<i>Branchiocapitella singularis</i> Fauvel	+			
<i>Eunice</i> sp.	+				<i>Capitella</i> sp.				+
<i>Lumbriconereis heteropoda</i> Mamenzeller	+				<i>Heteromastus similis</i> Southern	+		+	
<i>Lumbriconereis impatiens</i> Claparede			+		<i>Heteromastus</i> sp.				+
<i>Lumbriconereis latreilli</i> Audouin & Milne-Edwards	+				<i>Mastobranchnus indicus</i> Southern	+			
<i>Lumbriconereis malaysiae</i> Rullier		+			<i>Paraheteromastus tenuis</i> Monro	+	+	+	
					<i>Pulliiella armata</i> Fauvel	+			

Scientific name	India	Malaysia	Thailand	Japan
Spionidae				
<i>Polydora kempfi</i> Southern	+			
<i>Polydora</i> sp.	+			
<i>Prionospio cirrifera</i> Wiren	+			
<i>P. pinnata</i> Ehlers	+			
<i>Prionospio</i> sp.				+
<i>Scoletepus</i> sp.	+			
<i>Spio bengalensis</i> Willey	+			
Ampharetidae				
<i>Amphicteis gunneri</i> Sars	+			
<i>Melinna aberrans</i> Fauvel			+	
<i>Melinna cristata</i> (Sars)			+	
Opheliidae				
<i>Ammotrypane aulogaster</i> Rathke	+			
<i>Armandia</i> sp.				+
Orbiniidae				
<i>Scoloplos armiger</i> (Muller)			+	
Maldanida				
<i>Euclymene annandalei</i> Southern		+	+	
Sabellaridae				
<i>Sabellaria pectinata</i> Fauvel	+			
Sternaspidae				
<i>Sternaspie scutata</i> (Ranzani)	+			
Sabellidae				
<i>Laonome indica</i> Southern	+			
Serpulidae				
<i>Mercierella enigmatica</i> Fauvel	+			
Teribellidae				
<i>Pista indica</i> Fauvel	+			
Total	62	8	22	5

mangrove areas of Asian countries (Malaysia - 8 species, Thailand - 22 species and Japan - 5 species) may be due to the paucity of scientific and systematic studies. In other countries studies on polychaetes have been carried out only at Kapar Mangrove Forest Reserve, Port Swettenham, Selangor in Malaya, at Ao Nam-Bor Shore, Phuket Island in Thailand and at Iriomote Island, Okinawa in Japan. In India studies have been carried out in three regions, Sunderbans, Mumbai and Cochin. The region-wise studies in India largely reflect in maximum richness and diversity of species there.

The dissimilarity in species composition was found to be higher than their similarity. However, common species found at least between two countries are *Lepidonotus kumari*, *Dendronereis arborifera*, *Nereis chingringhattensis*, *Diopatra neapolitana*, *Marphysa mossambica*, *Paraheteromastus tenuis*, *Heteromastus similis* and *Euclymene annandalei*.

Species diversity of Nereidae and Eunicidae

Members of the family Nereidae and Eunicidae were found higher in terms of species diversity in mangrove soil of Asia followed by Glyceridae, Spionidae and Capitellidae (Table 1). Among the Nereidae, the genera *Nereis* and *Perinereis*, and among Eunicidae, the genera *Lumbrionereis* and *Marphysa* contributed to comparatively high species diversity.

Adaptations of polychaete fauna to mangrove habitat

The present study does not account the species-wise abundance of the polychaete group. However, the species encountered in mangrove soil have certain adaptations for survival. Fluctuations in soil salinity, accumulation of abundant detritus derived from mangrove litter, high nutrient enrichment especially carbon, sulphur, and nitrogen, derived during putrefaction of litter, anoxic conditions of deep soil and frequent exposure and submergence of littoral soil by tidal action are specific to the mangrove substratum. Variation in salinity and high soil fertility is more pronounced. Therefore, polychaetes found throughout the year are euryhaline and highly adapted to the peculiar characteristics of mangrove environment.

Importance of mangrove infaunal polychaetes

Mangrove habitat has a variety of micro-, meio- and macro-organisms. Polychaete worms are included both in meio and macro fauna, but largely under macro faunal group. Firstly, they play a useful role in the recycling of organic materials formed during the decomposition of mangrove litter and subsequent detritus formation and nutrient release, thereby improving the soil structure and its productivity through nutrient cycling. Secondly, the biomass of these worms is used as a source of food in addition to the main source of mangrove detrital and particulate matters by commercially important aquatic organisms, mainly benthic feeders of the mangrove environment. Thirdly, they provide stability to the soil habitat in terms of their diversity

and species abundance. As a whole, polychaete worms have a pivotal role to play in the fertility of the mangrove soil.

Conclusion

India is one of the most important hotspot areas of polychaete biodiversity. The present study also substantiates this in terms of richness and diversity of infaunal polychaetes in Indian mangroves. Latitudinal difference may well be reflected on the reduction of species richness in mangroves in Japan and from where it increases towards the Indian subcontinent (equator). Inadequacy of extensive field surveys and lack of recent literature prevent a detailed comparative analysis. More taxonomic work on polychaete fauna need to be carried out in the least explored mangroves of the majority of Asian countries. Research departments dealing with ecological and taxonomical studies should take positive and initiative steps for this and such a coordinated study linking various institutes can give a comprehensive account on the taxonomic aspects of polychaetous annelids of Asian countries.

References

- Anno, (1992).** Mangroves, pp. 324-327. In: *Global Biodiversity: Status of the Earth's Living Resources*, London.
- Frith, D.W., R. Tantanasiwong and O. Bhatia (1976).** Zonation of macrofauna on a mangrove shore, Phuket Island, Southern Thailand. *Phuket Marine Biological Center Research Bulletin* 10: 1-37.
- Kumar, R.S. (2001).** A check list of polychaetous annelids from some Indian Mangroves. *Zoos' Print Journal* 16(3): 439-441.
- Omori, K. (1989).** Comparative study on benthic community structures in two mangrove swamps of Iriomote Island, Okinawa. *Galaxea* 8: 11-15.
- Saenger, P., E.J. Hegerl and J.D.S. Davie (editors) (1983).** *Global status of mangrove ecosystems*. Commission on ecology papers number 3. IUCN, Gland, Switzerland.
- Sasekumar, A. (1974).** Distribution of macrofauna on a Malayan mangrove shore. *Journal of Animal Ecology* 43: 51-69.