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DIVERSITY AND DISTRIBUTION OF ARTHROPOD FAUNA IN RELATION TO MANGROVE VEGETATION ON A NEWLY EMERGED ISLAND ON THE RIVER HOOGHLY, WEST BENGAL

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INTRODUCTION

In the reservation and management of land for conservation, decisions on the size of areas required for maintaining species in sustainable populations is an important issue. The reverse problem is that of assessing a species, ability to persist after habitat fragmentation. In an attempt to investigate these topics an experiment was established in a newly emerged Island. The ecology of the forest ecosystem in India was mainly projected to a study of the community structure and composition, succession and management. Few of the studies from dry deciduous and pine forests soil have however, been restricted to one aspect, that is mainly on the forest ecosystem (Prabhoo 1976, Mahajan and Singh 1978, Hazra 1978, Reddy and Alfred 1978) But so far the effects of planted mangrove area and natural mangrove area of the same Island and same environmental area have not been made, whereas the present paper focuses upon the quantitative account of soil fauna and their similarity index in a planted mangrove and natural mangrove area of the newly emerged Island at Haldia in West Bengal.

Key words : Mangrove, Soil arthropods.

MATERIAL AND METHODS

A total of 192 soil samples were drawn from planted mangrove area and natural mangrove area of the Island at every month for a period of one year. Samples were drawn at randomly. The extraction of soil samples was carried out by the expedition faunal apparatus modified by Macfadyen (1953). A 40 W bulb was used for heating and as light source. Index of similarity is established by the Bray and Curty (1957).

LOCATION AND CHARACTERISTICS OF SAMPLING SITES

The Island lies on the river Hooghly opposite to the port of Haldia in West Bengal. The Island is spindle shaped with total area of about 29.38 sq km. The Island is flat with an average height of 3' to 5' from riverbed. The formation of these Islands is the out come of the high tide and low tide action of river water since 1988. These Islands formed out of sediment deposition during the past several decades, started accreting from 1945.

Between 1967 and 1977 the Island progressively enlarged. The Calcutta port Trust started revegetating the erosion prone Island with mangroves in collaboration with ZSI at its western tip covering an area of about 4 sq km during 1991, whereas other part of the 15 sq km and 10.39 sq km made for fishing and human habitat. The fishery and human habitat area are natural mangrove area. In the periphery of the Island *Sonneratia* was first planted mangrove followed by *Avicenni marina, A officinalis, Nipa fruticans, Exococcaria sp, Xyllocarps mollscensis.* The core mangroves species belonging to genera *Rhizophore apiculata.*

RESULT AND DISCUSSION

The soil arthropod fauna obtained from both the sites are presented in Tables 1 & 2, including their number of each group (12 No) from planted mangrove area and natural mangrove area. The Mites were most dominant group where the total arthropods population collected from both the site followed by collembola. The quantitatively artificial raised mangroves sites bound maximum population of all the arthropod faunal groups except Hymenoptera and Arnae (spider) population were maximum in Meen Dweep area. The third dominant group was coleoptera. The following similarity index formula has been used to analyze the similarity between faunal groups in two different habitats with the help Bray and Curty (1957) formula. The formula is

$$CN = 2JN/(aN + bN),$$

aN = Total no of individual of all the sp present in 1st habitat, bN = Similar to a N but in 2nd habitat, JN = Sum of lesser value of sp which are common in both the habitat.

The index varies from 0–1. Here three comment given below :

(1) If CN = 0, no similarity

(2) If CN = <0.5, dissimilar

(3) If CN = >0.5 similar

Here the CN = 0.2.

Therefore, it may be concluded from the above study that although the two habitats are in same environmental condition but the composition of fauna are not similar in two sites of the island (Planted mangrove area & Natural Mangrove area) in this regards.

Table 1. : Soil arthropods in Nayachar (Planted forest).

Sl. No.	Groups/Order	Jan	Feb	Mar	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Total
1.	Mites	60	77	55	42	21	26	80	89	60	26	27	46	**609**
2.	Collembola	30	48	27	32	20	12	39	56	20	22	18	19	**343**
3.	Coleoptera	3	9	11	7	0	7	6	18	2	3	0	5	**71**
4.	Diptera Larvae	3	6	7	0	8	11	0	0	6	0	3	2	**46**
5.	Orthoptera	0	1	3	0	0	2	0	0	4	0	1	0	**11**
6.	Hymenoptera	7	0	7	0	6	0	0	6	0	4	0	0	**30**
7.	Hemiptera	0	0	1	0	0	0	1	0	0	2	0	0	**4**
8.	Isopoda	3	5	0	6	0	2	2	0	0	0	3	0	**21**
9.	Sand Flea	0	0	0	1	0	0	0	0	0	0	0	0	**1**
10.	Centiped	2	2	7	12	0	0	2	2	0	4	2	3	**36**
11.	Milliped	1	5	0	2	0	4	4	6	0	2	2	3	**29**
12.	Spider	0	0	3	0	0	2	0	1	0	1	0	0	**7**

Table 2. : Soil arthropods in Meen Dweep (Natural Mangrove).

Sl. No.	Groups/Order	Jan	Feb	Mar	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Total
1.	Mites	7	12	13	8	7	10	17	19	11	16	6	8	**137**
2.	Collembola	5	6	6	7	4	8	16	11	12	8	5	3	**91**
3.	Coleoptera	2	0	3	1	1	2	0	1	2	0	0	0	**12**
4.	Diptera Larvae	2	1	0	0	2	0	0	3	0	0	0	0	**8**
5.	Orthoptera	1	0	0	0	0	1	0	0	0	2	0	0	**4**
6.	Hymenoptera	5	2	1	0	4	0	7	2	0	7	8	10	**39**
7.	Hemiptera	0	1	0	0	0	2	0	0	0	0	0	0	**3**
8.	Isopoda	2	0	3	0	3	0	2	0	0	0	0	2	**12**
9.	Sand Flea	0	0	0	0	0	0	0	0	0	0	0	0	**0**
10.	Centiped	1	2	0	1	0	2	0	3	2	0	0	0	**11**
11.	Milliped	0	3	0	0	0	1	1	0	1	0	0	0	**6**
12.	Spider	0	0	0	3	3	2	0	2	1	0	0	0	**11**

Table 3. : Soil arthropods in Nayachar (Planted mangrove) and Meen Dweep (Natural mangrove) 2003.

Sl.-No.	Groups/Order	Nayachar	Meen Dweep
1.	Mites	609	137
2.	Collembola	343	91
3.	Coleoptera	71	12
4.	Diptera Larvae	46	8
5.	Orthoptera	11	4
6.	Hymenoptera	30	39
7.	Hemiptera	4	3
8.	Isopoda	21	12
9.	Sand Flae	1	0
10.	Centiped	36	11
11.	Milliped	29	6
12.	Spider	7	11
13.	**Total**	**1201**	**334**

SUMMARY

Altogether 12 groups of arthropods were obtained and majority of these fauna were insects. An index of similarity followed by Bray and Curty method (1957) have been analysed to know the relationship between the faunal components of two sites in spite of their presence in the same island and environmental condition. The study was conducted in a newly emerged island in the river Hooghly, Haldia. A total of 192 soil samples were drawn from two different chosen localities of the Island from (January 2003 to December 2003). One of the localities was covered with natural mangrove vegetation (Meen Dweep) and other site was covered with artificially raised mangroves (Nayachar). There results have been discussed in detail in this paper.

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