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SOIL MICRO-ARTHROPODS POPULATION IN ALLUVIAL AND COASTAL SOIL IN MIDNAPORE DISTRICT WITH SPECIAL REFERENCE TO RELATIVE ABUNDANCE

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INTRODUCTION

The earliest attempt to study the soil fauna was made by Diem (1930) in the alpine soil. There after a series of workers have published on taxonomy, ecology of collembola, Acarina (mites) of different ecosystem in India and abroad viz. Brown (1912-13) Imms (1912), Mitra *et al.* (1977), Hazra and Choudhuri (1981, 83). Although, considerable works have so far been made on soil fauna of West Bengal in general (1-8) but very little is known as to the relative abundance of soil arthropods in relation to different types of soil. Soil salinity has becoming a worldwide problem causing significant losses of arable land. Investigations of the effect of salinity have mainly been concentrated on the physical and chemical changes brought about by excess salts in the soil (1, 2). However the effects of salinity on micro arthropods components of the soil have not been examined in details. Present investigation has been under taken to record the occurrence and proportionate distribution as adjudged from the analysis of relative abundance from different soil types experiencing different salinity condition.

KEY WORDS : *Micro arthropods, Salinity, Relative abundance.*

Characteristic of study area :

Nayachar Island lies on the river Hooghly opposite to the port of Haldia in Midnapore district. The island is spindle shaped with total area of about 29.38 sq km. The climate in this island is of subtropical type. For the plantation programme of the island mangrove plant selected were *Sonneratia* followed by *Avicenia marina, A officinalis, Nipa fruticans, Exocoecaria* sp.,

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Xyllocarps molluscensis and *X. granatum*. Second site was Dadanpatharabhar is the important fish landing processing center is situated around 8 km away from Kontai by the side of Sea. A patch of mangrove is still present here under stressed condition which is reflected by scanty growth. The soil is sandy loam. The climate in this area subtropical type. The third site Khejuri is a small coastal village with historical important is situated on the bank Haldi estuary. The soil is sandy loam and goods patches of mangroves have come up during last one-decade giving impression of healthy mangrove environment.

MATERIAL AND METHOD

Soil samples were collected at random at the rate 6 samples per plot at one-month interval during July, 2003 to June, 2004. The soil samples were taken from each sites for soil micro arthropods extraction and also for the estimation of soil parameters. Extraction of soil samples were carried out by 'Expedition type Tullgram Faunal Apparatus' modified by Macfadyen (1953). A 40-watt bulb was used for heat and light source. Soil factors were analysis by the laboratory stander method. Relative abundance was calculated with the help of formula Jose M. Paruelo *et al.* (1996).

RESULT AND DISCUSSION

Soil micro arthropods at Nayachar Island (Table-1) shows that the relative abundance was always high in July, January and March and comparatively low during September, November, and March. Relative abundance (With the help of Jose M Paruelo et al formula) of mites (Acarina) showed maximum results followed by Collembola, coleoptera, Centiped, Milliped, Hymenoptera (Table-1).

Dadanpatharabar (Table-2) registered high relative abundance of soil micro arthropods during March only and during other sampling periods comparatively less relatively abundance was notice. Relative abundance of Acarina (Mites) was found to maximum followed by Collembola, coleoptera, sand flea. Khejuri (Table-3) registered higher relative abundance of soil micro arthropods population of (Acarina) mites followed by Collembola and sand flea.

Soil parameter played an important role in determining the relative abundance of soil microarthropods. Temperature was comparatively similar in three sites. In case of pH study, the Nayachar has less pH than other two sites. Khejuri and Dadanpatharabar sites are highly saline than Nayachar Island. In Nayachar the soil moisture was high. Organic carbon comparatively high in Nayachar Island other than two other sites. During study period, Collembola and Acarina (Mite) relative abundance was high in all sites than other groups.

Results

Table 1 : (Nayachar Island) (%).

Groups/Order	July 03	Sep 03	Nov 03	Jan 04	March 04	May 04
Mites	59.7	69.76	52.94	56.6	48.24	44.68
Collembola	29.1	23.25	35.29	28.3	25.68	42.55
Hymenoptera	0	0	0	6.60	6.14	12.76
Orthroptera	0	4.65	1.96	0	2.63	0
Hemiptera	0.74	0	0	0	0.87	0
Isopoda	1.49	0	5.88	2.83	0	0
Sand Flea	0	0	0	0	0	0
Centiped	1.49	0	0	1.88	6.14	0
Milliped	2.98	0	3.92	0.94	0	0
Spider	0	0	0	0	2.63	0
Coleoptera	4.47	2.32	0	2.83	9.64	0
Total population	134	86	51	106	114	47

Table 2 : (Dadanpatharabhar) (%).

Groups/Order	July 03	Sep 03	Nov 03	Jan 04	March 04	May 04
Mites	63.15	66.66	64.7	35	32.07	33.33
Collembola	15.78	27.77	11.76	20	35.84	23.8
Hymenoptera	0	0	5.88	30	0	9.52
Orthroptera	0	0	0	0	0	0
Hemiptera	0	0	0	0	0	0
Isopoda	0	0	0	5	0	0
Sand Flea	0.52	0	17.64	10	0	33.33
Centiped	0	0	0	0	1.88	0
Milliped	0	0	0	0	0	0
Spider	0	0	0	0	0	0
Coleoptera	10.52	5.26	0	0	30.18	0
Total population	19	18	17	20	53	21

Table 3 : (Khejuri) (%).

Groups/Order	July 03	Sep 03	Nov 03	Jan 04	March 04	May 04
Mites	30.43	34.48	75	33.33	48.64	48
Collembola	26.08	34.48	25	25	43.24	32
Hymenoptera	34.78	0	0	16.66	8.10	16

Table 3 : (*Cont'd.*).

Groups/Order	July 03	Sep 03	Nov 03	Jan 04	March 04	May 04
Orthroptera	0	0	0	0	0	0
Hemiptera	0	0	0	0	0	0
Isopoda	0	0	0	0	0	4
SandFlea	0	3.44	0	16.66	0	0
Centiped	0	0	0	0	0	0
Milliped	0	0	0	0	0	0
Spider	0	0	0	0	0	0
Coleoptera	8.69	27.58	0	8.33	0	0
Total population	23	29	12	12	37	25

Soil factors of Nayachar Island

Month	Tem (°C)	ph	Salinity ds/m	Moisture %	Organic Carbon
July	32	6.7	1.13	15.2	0.9
Sep	29	6.66	1.11	9.39	0.82
Nov	24	6.5	1.6	8.87	0.62
Jan	18	5.9	1.9	9	0.6
Mar	30	6	2	5.99	0.55
May	31	6.33	2.1	7.23	0.58
Mean Value	27.33	6.34	1.64	9.28	0.67

Soil factors of Dadanpatharbar 2003

Month	Tem (°C)	ph	Salinity ds/m	Moisture %	Organic Carbon
July	32.33	6.66	5.9	8.59	0.12
Sep	28.6	6.68	5.66	4.33	0.2
Nov	25	7	6.7	3.2	0.11
Jan	19	7.2	7.9	2.1	0.19
Mar	30	6.65	8.99	1.91	0.11
May	31.5	7.22	10.1	1.81	0.15
Mean Value	27.73	6.9	7.54	3.65	0.14

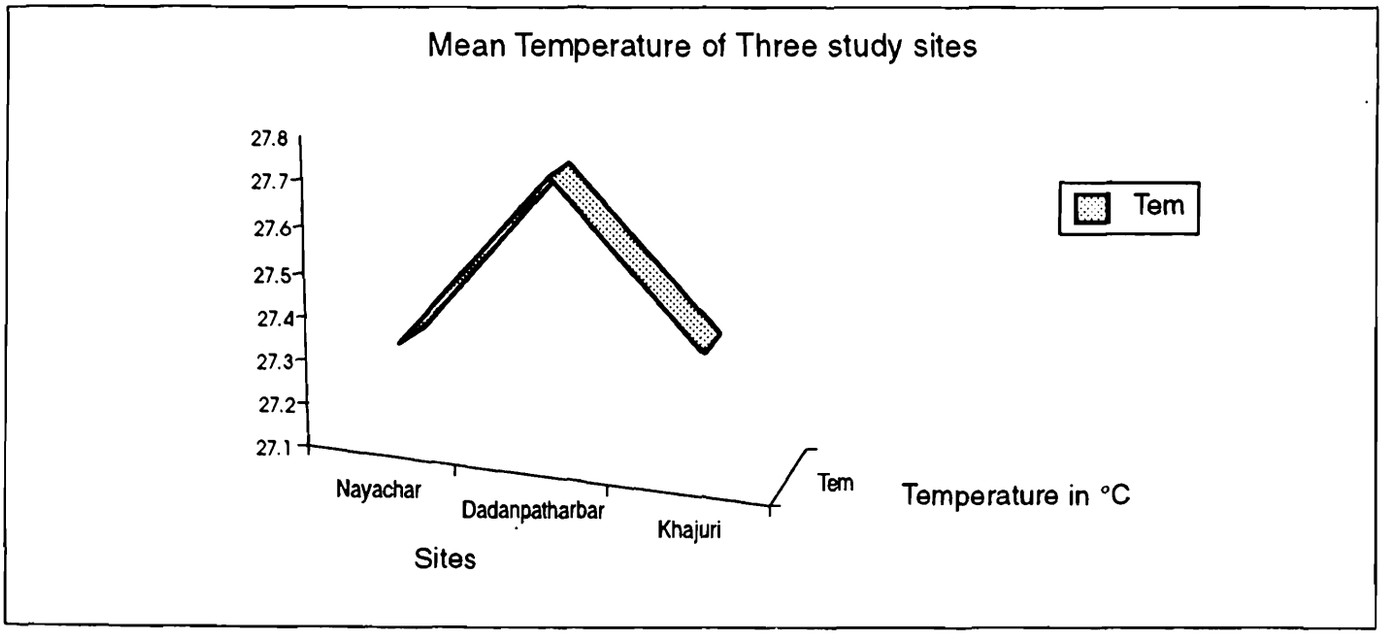
Soil factors of Khajuri 2003

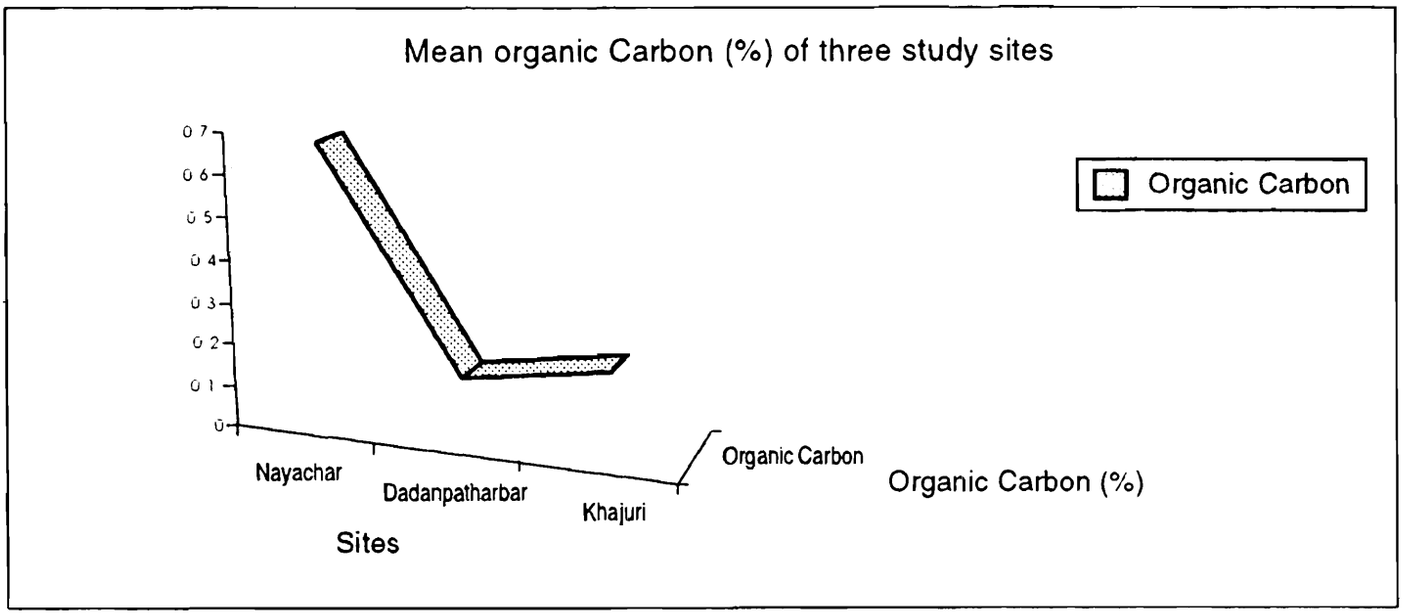
Month	Tem (°C)	ph	Salinity ds/m	Moisture %	Organic Carbon
July	31.9	7.1	6.2	11.1	0.21
Sep	28	6.7	6.7	6.5	0.22
Nov	25.5	7.2	7.2	5.33	0.19
Jan	17.9	7.89	7.89	4.6	0.11
Mar	31	8.88	8.88	3.2	0.13
May	30	11.29	11.29	3.8	0.32
Mean Value	27.38	8.02	8.09	5.75	0.196

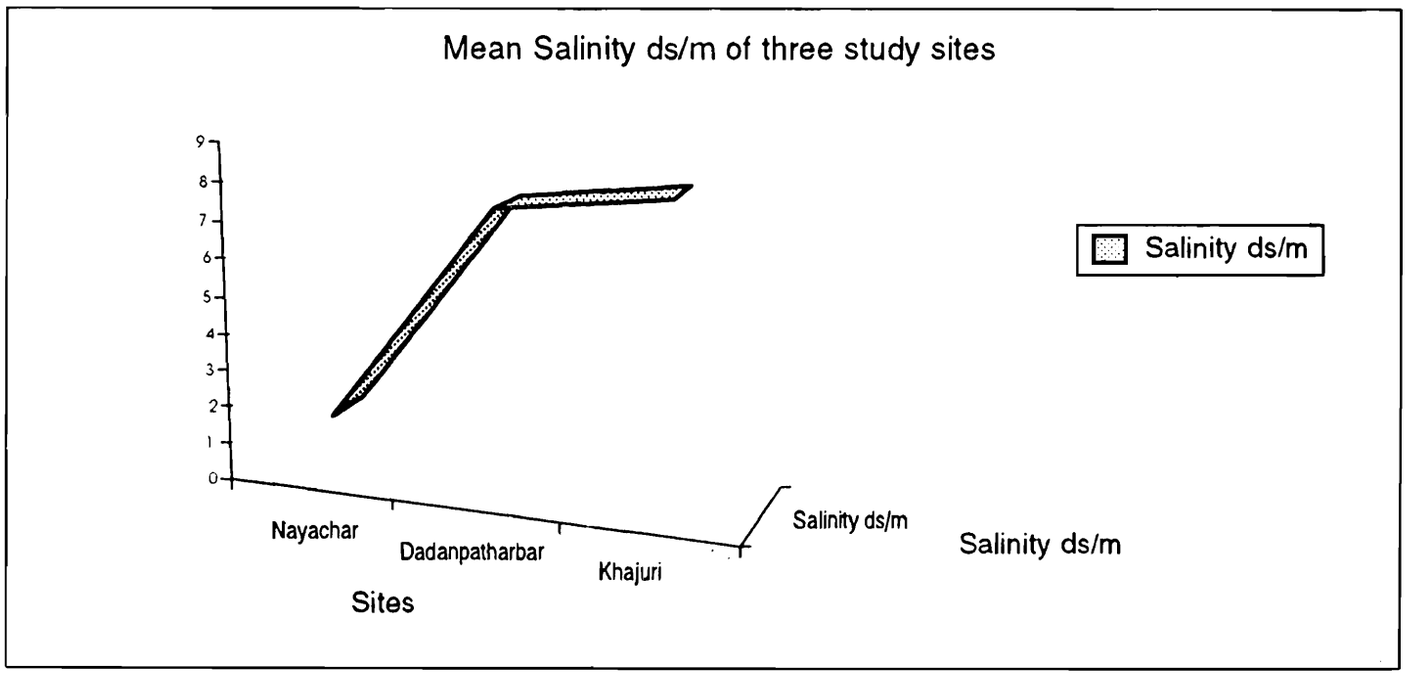
So it can be concluded that the soil salinity and organic carbon was highly responsible for abundance of micro arthropods. This result coincides with the result of Jose M. Paruelo *et al.* (1996). Although the other soil parameters evaluate this study. Detail study is going on.

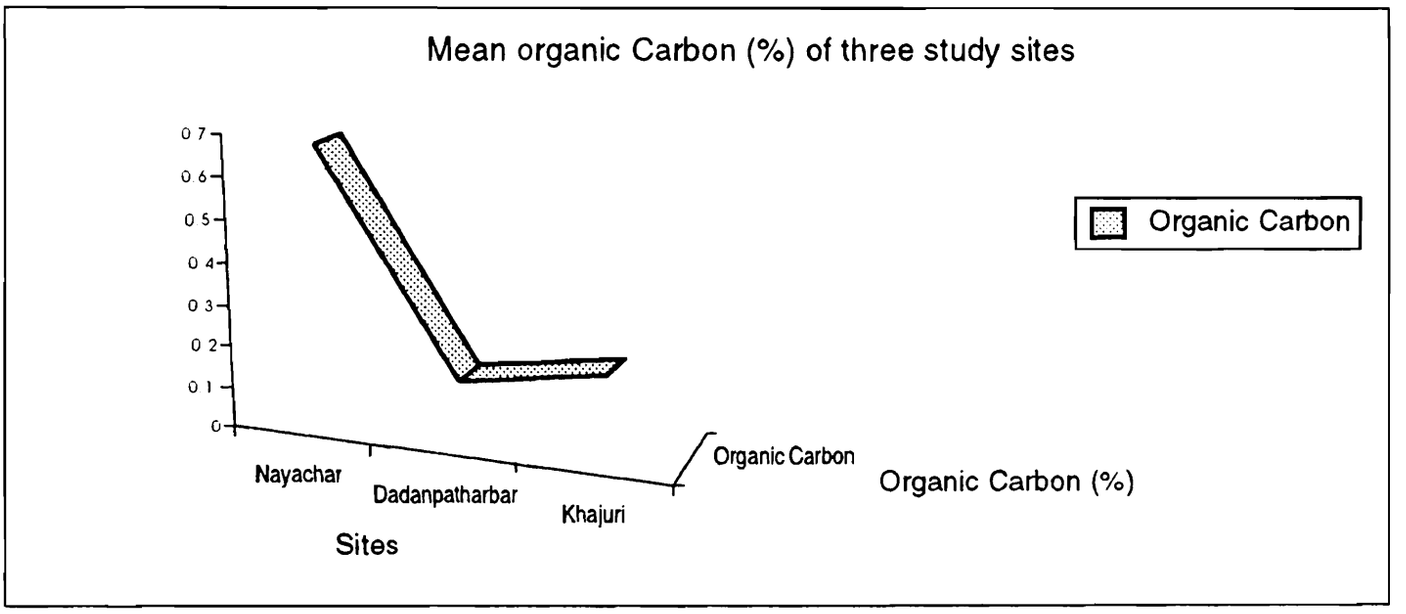
SUMMARY

Population of various soil microarthropods were studied in soil of three separate sites *viz.* Nayachar Island, Khejuri and Dadanpatharbar of Midnapore coastal tract of West Bengal, India. The density of soil micro arthropods was tended to fluctuate vis-à-vis decrease and increase with the variability of ecological parameters in different sites. A total of 162-soil samples collected during July, 2003 to June, 2004 from above mentioned study sites. Relative abundance showed Collembola and Acarina (Mites) were the most dominant group among micro arthropods.




Mean organic Carbon (%) of three study sites
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Organic Carbon
Nayachar
Dadanpatharbar
Khajuri
Organic Carbon
Organic Carbon (%)
Sites


Mean Salinity ds/m of three study sites
9
8
7
6
5
4
3
2
1
0
Salinity ds/m
Nayachar
Dadanpatharbar
Khajuri
Salinity ds/m
Salinity ds/m
Sites


Mean organic Carbon (%) of three study sites
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Organic Carbon
Nayachar
Dadanpatharbar
Khajuri
Organic Carbon
Organic Carbon (%)
Sites

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