

Benthic Macro & Meiofauna of Seagrass (*Thalassia hemprichii*) Bed at Minicoy, Lakshadweep

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Macrofauna, comprising 9 groups, was dominated by polychaete worms, while meiofauna, comprising 10 groups, was dominated by nematodes. Densities of both macro and meiofauna were higher near the shore where biomass of *T. hemprichii* was maximum.

Seagrass is a complex assemblage that performs multiple functions such as providing micro habitats for animals, substrata for epifauna and epiphyte and as an important source of organic detritus^{1,2}. While some information on macrofauna of such ecosystem is available³⁻⁵, very little is known on meiofaunal distributions in seagrass system⁶.

From the Indian coast, no information is available on the benthic fauna of the Seagrass Communities. This communication gives the benthic fauna of turtle grass, *Thalassia hemprichii* bed of a tropical lagoon at Minicoy, Lakshadweep.

Data for the present study were collected during the 104 cruise of *RV Gaveshani* to Minicoy in Jan. 1982. Four stations were selected within the *T. hemprichii* bed in the lagoon area (Fig. 1) where sts 2 and 4 had thick growth. At each station, 3 replicate samples of macrofauna were taken with a corer (60 cm² area). The sample from each core was sieved (0.5 mm mesh) and preserved in 5% buffered formalin. For meiofauna, a corer of 4.5 cm inner diam. and 10 cm length was used. Separate samples were taken for sediment characters and biomass of turtle grass. Benthic fauna⁷ and sediment particle size distribution⁸ were determined.

The Minicoy lagoon occupies about 9.66 km² area with an average depth of 2 m (approx.) and with a tidal amplitude of 1.57 m. During the study, average salinity of water was 33.4×10^{-3} , pH ranged from 7.98 to 9.14, dissolved oxygen ranged from 3.8 to 5.5 ml.l⁻¹ and phosphate and nitrate concentrations ($\mu\text{g. at.l}^{-1}$) were 0.44 and 0.9 respectively.

The nature of sediments (Table 1) at sts 1 and 4 was of fine sand (0.250-0.125 mm). While at sts 2 and 3 it was very fine sand (0.125 to 0.063 mm). Sts 2 had higher percentage of silt and clay followed by st 4. The sediments varied from moderately well sorted to poorly sorted. Such variation within the lagoon sediment was expected because of poor wave action and currents. This reduces the active sorting thus increasing the finer size particle⁴. Further, dense bed of

T. hemprichii also reduces the wave action near the bottom, thus trapping and preventing removal of finer sediment particles². This feature could be observed at st 2 where a thick bed of *T. hemprichii* was associated with fine sediment (median particle diam., $M_d = 0.092$ mm).

Highest value of biomass (Table 1) of *T. hemprichii* was found at st 2 followed by sts 4, 1 and 3. High biomass up to 1 kg.m⁻² of turtle grass was observed by Untawale and Jagtap⁹ from the same lagoon at Minicoy. Macrofaunal groups and their occurrence are given in Table 2. A total of 4516 individuals belonging to 9 taxonomic groups were recorded. Faunal density (No. m⁻²) was highest at st 2 followed by sts 4, 1 and 3. Polychaeta was numerically the most dominant group followed by Amphipoda, Ostracoda and Isopoda.

The macrofaunal abundance in the present study is comparable to that reported from other areas². It has been suggested that an increased surface area and increased habitat complexity in seagrass systems plus

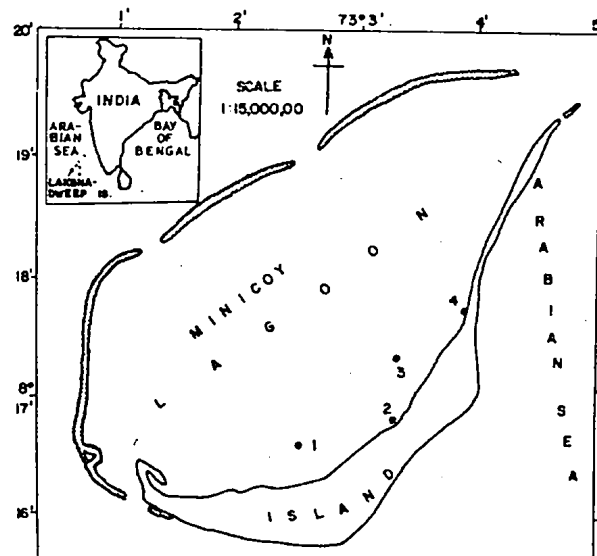


Fig. 1— Minicoy lagoon showing station positions

Table 1—Sediment Characteristics and Biomass of *T. hemprichii*.

St	Sand (%)	Silt (%)	Clay (%)	Md (mm)	Sorting coeff. (mm)	Biomass (g.m ⁻²)
1	90.36	4.45	5.18	0.182	0.62	595
2	73.86	13.49	8.65	0.092	0.42	900
3	87.35	7.31	5.32	0.102	0.56	524
4	84.54	9.23	6.22	0.132	0.46	860

Md = median particle diameter

Table 2—Average Macrofaunal Density (No.m⁻²) at Different Stations

Faunal group	Stations				Composition (%)
	1	2	3	4	
Polychaeta	314	763	363	577	44.6
Pelecypoda	33	66	16	49	3.6
Amphipoda	82	542	33	99	16.7
Isopoda	—	443	—	82	11.6
Ostracoda	132	396	—	999	13.8
Echiurida	16	16	33	33	2.2
Sipunculida	—	—	16	33	1.0
Anthozoa	66	33	—	16	2.5
Gastropoda	33	—	33	99	3.7
Total	676	2259	494	1087	

an abundance of food from decaying seagrass and organic sedimentary material support these large and diverse populations of benthic invertebrates in such ecosystem^{1,10}.

Distribution and abundance of macrofauna were related to the density and biomass of *T. hemprichii* in the area studied. The highest and lowest biomass of *T. hemprichii* coincided with highest and lowest macrofaunal density. Generally species richness and density increased with increasing plant biomass at the collection site^{2,11}. The present study corroborates these findings.

Total meiofaunal count is given in Table 3. About 10 taxonomic groups were encountered and the meiofaunal density was highest at st 4 followed by st 2. The population density was lowest at st 3. Nematoda were the most common and numerically abundant group comprising 51% of the fauna. Harpacticoida were next in abundance followed by Turbellaria and Oligochaeta. Other groups like Gastrotricha Archiannelida, Tardigrada and Ostracoda were less abundant components of the meiofauna.

Like macrofauna, the meiofauna showed a positive correlation with *T. hemprichii* biomass, a feature also observed by Teal and Wieser¹². It has been

Table 3—Average Meiofaunal Density (No.10cm⁻²) at Various Stations

Faunal group	Stations				Composition (%)
	1	2	3	4	
Nematoda	529	773	462	941	51.0
Harpacticoida	195	305	232	365	20.6
Polychaeta	58	152	19	16	4.6
Turbellaria	90	112	64	240	9.5
Oligochaeta	—	72	57	152	5.3
Gastrotricha	26	81	19	16	2.6
Archiannelida	12	16	—	53	1.5
Tardigrada	12	—	15	—	0.5
Ostracoda	—	20	19	—	0.7
Crustacean larvae	46	23	27	81	3.3
Total	968	1554	914	1864	

demonstrated that the biogenic structures like plant culms and root biomass are sources of spatial and structural heterogeneity in seagrass system which favours rich and diverse meiofauna population⁶. The seagrass system not only provides stability to the sediment for meiofauna to settle, but also serves as refuge for them. Average organic carbon percentage¹³ in *T. hemprichii* is as high as 24.6%, which will give rise to a high concentration of organic matter after decay that serves as food for most of the deposit feeding forms in seagrass ecosystem.

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References

- 1 Wood E J F, Odum W E & Zieman J C, *Simp Inter Lagunas Costeras* (UNAMUESCO) 1969, 495.
- 2 Orth R J, *Chesapeake Sci*, 14 (1973) 258.
- 3 Heck K L & Whetstone G S, *J Biogeogr*, 4 (1977) 135.
- 4 Orth R J, in *Ecology of marine benthos* edited by B C Coull (University of South Carolina Press, Columbia) 1977, 281 pp.
- 5 Woodin S A, *Ecology*, 59 (1978) 274.
- 6 Bell S S, Watzin M C & Coull B C, *J Exp Mar Biol Ecol*, 35 (1978) 88.
- 7 Parulekar A H, Nair S A, Harkantra S N & Ansari Z A, *Mahasagar - Bull Natn Inst Oceanogr*, 9 (1976) 51.
- 8 Folk R L, *Petrology of sedimentary rocks* (Hemphill, Austin, Texas) 1961, 154 pp.
- 9 Untawale A G & Jagtap T G (personal communication).
- 10 Connel J H, in *Ecology and evolution of communities*, edited by M Cody & J Diamond (Harvard University Press, Cambridge) 1975, 460 pp.
- 11 Stoner A W, *Bull Mar Sci*, 30 (1981) 537.
- 12 Teal J M & Wieser W, *Limno Oceanogr*, 11 (1966) 217.
- 13 Jagtap T G & Untawale A G, *Indian J Mar Sci*, 13 (1984) 123.