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THE SPECIES COMPOSITION, ABUNDANCE AND THE DISTRIBUTION OF SEAGRASS COMMUNITIES IN PUTTALAM LAGOON

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Abstract

The species composition, abundance and the distribution of different seagrass beds of Puttalam lagoon have been investigated. Eight species belonging to six genera were recorded during the investigation i.e., Enhalus acroida *(I.F.) Royle* Thalassia hemprichif *(Ehrenb.) Aschers.,* Halodule uninervis *(Forsk.) Aschers in Bossiser,* Syringodium isoetifolium *(Aschers.) Dandy,* Cymodocea rotundata *Ehernb. et Hempr. ex Aschers.,* Cymodocea serrulata *(R. Br.) Aschers, and Magnus,* Halophila ovalis *(R. Br.) Hook. F. and* Halophila decipiens *Ostenfeld. Two varieties of* Halodule uninervis *(narrow and wide) were also recorded during this investigation. The distribution pattern of the different species of seagrass beds showed a close association with different salinity values of the lagoon. It was found that the narrow variety of* Halodule uninervis *covered* 75% *of the potential areas of the lagoon. It was also observed that* Enhalus acroides, Cymodocea serrulata *and* Thalassia hemprichii play a *major role as substrata for many important epiphytic forms of macro and micro algae. It was also discussed that traditional fishing methods prevailing in this lagoon show a great threat to the survival of the seagrass communities.*

Key words : composition, abundance, distribution of seagrasses; Puttalam

1. Introduction

The seagrass communities are the most conspicuous and widespread biotypes in the shallow marine environment. They form extensive animal spawning grounds and habitats; additionally grass blades can be lucrative substrates for plant and *epiphytes* as well as being a direct food source for gracing animals such as sea urchins, manatees, turtles and some fishes (Odum, 1974). Their elaborate rhizome and root systems trap and stabilize the sediments. Therefore seagrass beds are an important part of neritic and estuarine systems (Wood et al, 1969).

There is very little information on seagrass communities of Sri Lanka, (Abeywickrema, 1986; De Silva & Ranathunga, 1987). Abeywickrema (Pers. comm.) and Samarakoon, 1988 has recorded 9 genera of seagrasses with 12 species in Sri Lanka. A recent study was done to map out the distribution of various species of seagrasses in Negombo lagoon by De Silva and Ranathunga (1987).

Puttalam lagoon is one of the largest lagoons in Sri Lanka which covers an area of 237 km^2 and provides large shallow areas which are favourable for the growth of seagrass communities. No work has been done on types, distribution or ecology of seagrass beds of Puttalam lagoon except for Salm (1981) who has indicated the location of the seagrass beds in Kokkilai lagoon, Puttalam and Dutch Bay, Jaffna and Mannar districts as well as Negombo lagoon.

Seagrass communities of Puttalam lagoon play a major role in various aspects such as providing food for one of the most endangered species of marine mammals (dugong) (Colin and Bertram, 1970; Jones, 1980) and providing breeding and nursery grounds for fish and shrimps, and act as one of the major substratum for the growth of *Gracilaria edulis* which is a commercially important seaweed species. They also serve as sheltered refuges and perhaps feeding areas for a number of juvenile pelagic fish in the lagoon.

Therefore it is very useful to study the extents and the types of seagrass communities in this lagoon. The main objectives of this study are to find out the different seagrass species, abundance and their distribution pattern in this lagoon.

2. Materials and Methods

This study was carried out in September to December in 1989. The total seagrass beds of the lagoon was covered by walking, snorkling and using a boat with a grab sampler in deeper areas. The seagrass communities were studied along transects (T1,-T14,) perpendiculer to the coast line. Transects were selected in such a way that as many different communities and habitats as possible could be investigated. The transects extended from the shore to the low water level and continued until only very similar communities were observed. Five to six one square meter quadrat samples were taken along each transect and the number of different seagrass species in each of them were counted. Extent and the distribution of the different communities were mapped and the abundance of dominant species were noted.

3. Results

Eight species belonging to six genera were recorded from the Puttalam lagoon during the present survey. The species *Cymodocca rotundata* was recorded for the first time in Sri Lanka.

Out of 9 genera of seagrasses recorded for Sri Lanka only six were found in the Puttalam lagoon Two variations of *Halodule uninervis* (narrow and wide leaves) were also found during this survey. Fig. 1 (a-i) shows the following varieties of seagrass species.

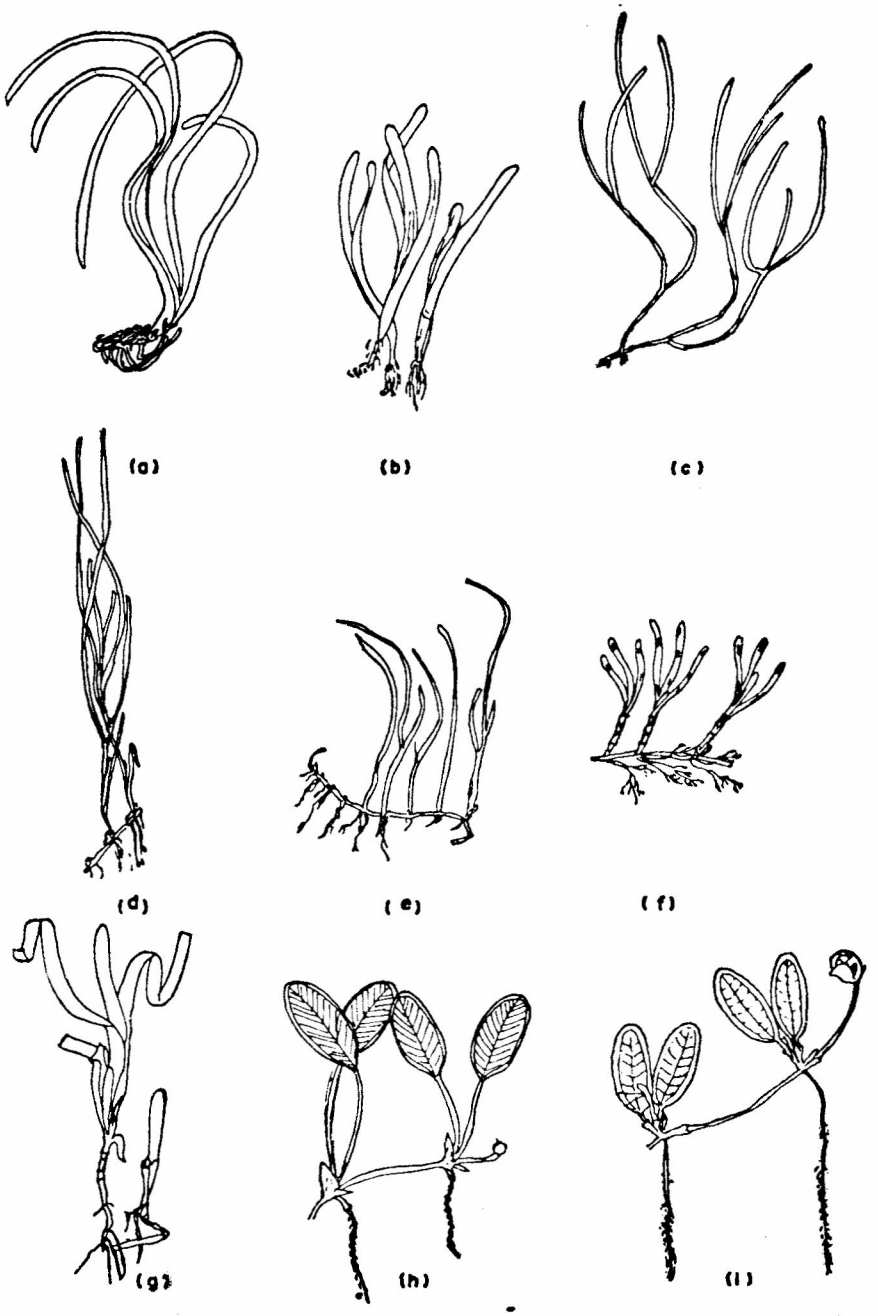

Fig. 1. (a-1) seagrass species found in the Puttalam Lagoon.

Fig. (a-1) seagrass species found in the Puttalam Lagoon.

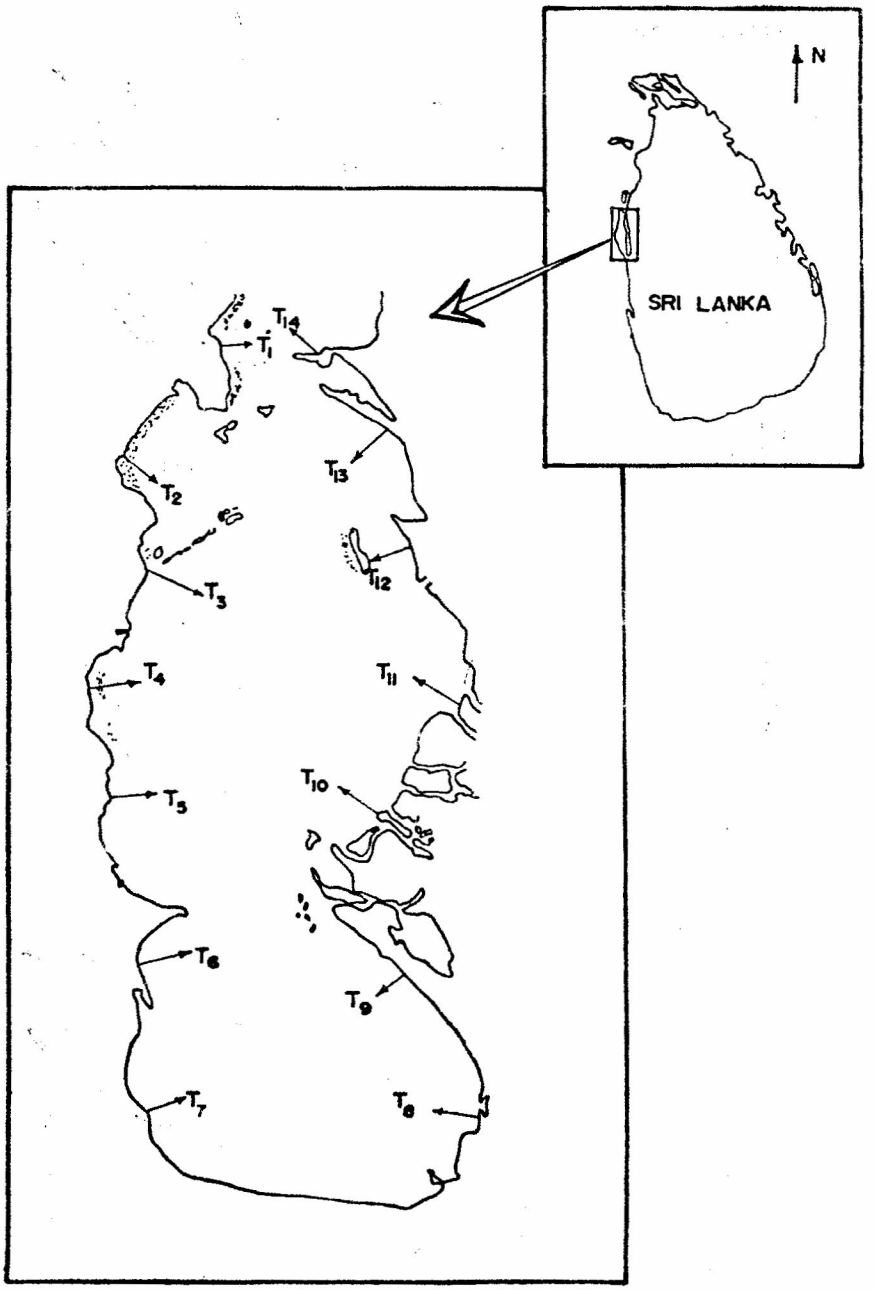

Fig. 2. Map of Puttalam lagoon showing the location of the 14 Transects (T - T)

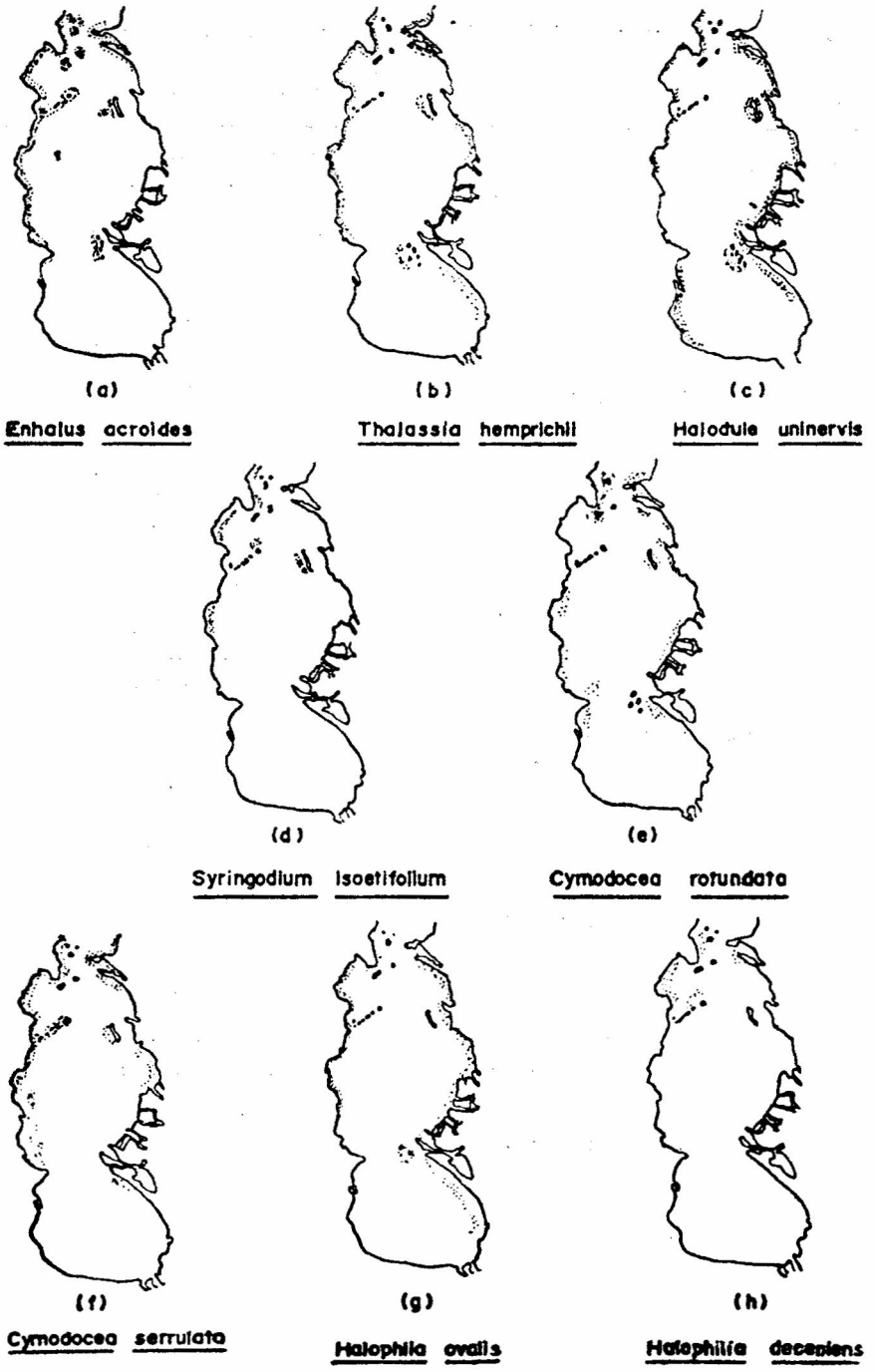

Fig. 3. (a)-(f) Distribution of eight seagrass species in the puttalam lgo.oan

Table 1

Distribution of seagrasses found along the transects in the west coast of Puttalam lagoon.

Station	Area	Seagrass species
Transect T 1	Kalpitiya (north western region)	*Enhalus acroides* *Cymodocea serrulata* *Cymodocea rotundata* *Halophila ovalis* *Halophila decepiens* *Thalassia hemprichii* *Halodule uninervis* *Syringodium isoetifolium*
T 2	Kuringipitiya (north western region)	*Halophila ovalis* *Thalassia hemprichii* *Enhalus acroides* *Syringodium isoetifolium* *Cymodocea serrulata* *Halodule uninervis*
T 3	Palliwasalthurai (north western region)	*Halophila ovalis* *Halodule uninervis* *Thalassia hemprichii* *Enhalus acroides* *Cymodocea serrulata*
T 4	Kandakuda (north western region)	*Halophila ovalis* *Halodule uninervis* *Enhalus acroides* *Thalassia hemprichii* *Cymodocea serrulata*
T 5	Etalai (south western region)	*Cymodocea serrulata* *Cymodocea rotundata* *Thalassia hemprichii* *Enhalus acroides* *Halophile ovalis*
T 6	Noracholai (south western region)	*Halodule uninervis* *Cymodocea rotundata*
T 7	Mampuri (south western region)	*Halodule uninervis*

Table II

Distribution of seagrasses found along the transects in the east coast of Puttalam lagoon.

Station		Area	Seagrass species
Transect	T 8	Palavi (south eastern region)	*Thalassia hemprichii* *Halodule uninervis* *Halophila ovalis*
	T 9	Puttalam (south eastern region)	*Halophila ovalis* *Halodule uninervis*
	T10	Seguwantive (north eastern region)	*Halophila ovalis* *Halodula uninervis* *Cymodocea rotundata*
	T11	Ambalama (north eastern region)	*Halophila ovalis* *Halodule uninervis* *Thalassia hemprichii*
	T12	Moongil Aru (north eastern region)	*Halophila ovalis* *Thalassia hemprichii* *Halodule uninervis*
	T13	Eluwankulama (north eastern region)	*Halophila ovalis* *Halodule uninervis*
	T14	Kara:3tve (north eastern region)	*Comodocea serrulata* *Halophila decepiens* *Thalassia hemprichii* *Enhalus acroides*

Table III

Percentage abundance of differennt sea grass species found in four different areas of the lagoon.

Species *Area*	*Enhalus acroides* %	*Thalassia hemprichii* %	*Halodule uninervis (narrow variety)* %	*Halodule uninervis (wide variety)* %	*Syringodium isoetifolium* %	*Cymodocea rotundata* %	*Cymodocea serrulata* %	*Halophila ovalis* %	*Halophila deceoubs*
North Western	42	16	6	2	4	2	14	8	6
South Western	—	33	59	1	—	2	5	—	—
North Eastern	22	15	15	4	8	6	8	20	2
South Eastern	25	18	38	—	8	5	6	—	—

1. *Enholus acroides* .. Fig. 1-a
2. *Thalassia hemprichii* .. Fig. 1-b
3. *Halodule uninervis* (narrow variety) .. Fig. 1-c
4. *Halodule uninervis* (wide variety) .. Fig. 1-d
5. *Siringodium isoetifolium* .. Fig. 1-e
6. *Cymodocea rotundata* .. Fig. 1-f
7. *Cymodocea serrulata* .. Fig. 1-g
8. *Halophila ovalis*.. .. Fig. 1-h
9. *Halophila decipiens* .. Fig. 1-1

Fig. 2 shows the map of the lagoon and the location of 14 transects. Fig. 3 a-h show the distribution of different seagrass beds in the Puttalam lagoon. Table 1 and 11 give the different seagrass species along the transects in the western and eastern parts of the lagoon respectively. Table III gives the percentage abundance of different seagrass species found in four different areas of the lagoon.

4. Discussion :

Out of the eight species of seagrasses found in the Puttalam lagoon *Halophila ovalis*, *Halodule uninervis*, *Thalassia hemprichii* and *Cymodocea serrulata* are the most common. The density of the other three spacies *Cymodocea rotundata*, *Halophila decipiens* and *Syringodium isoetifolium* are fairly low compared to the others. The distribution pattern of these eight species (Fig. 1 a-h) is influenced by the nature of the habitat and physico chemical parameters of the lagoon.

The salinity level of the water in the eastern part of the lagoon is fairly low (around 30-35 ppt) compared to the western part since several fresh water inlets fall on to the eastern side of the lagoon. The salinity level in the south western part of the lagoon is considerably high (45 to 50 ppt). The salt pans of the National Salt Corporation are also situated in this area.

Halodule uninervis narrow-leaf variety seems to have a high range of salinity tolerance as it is found in the south western part and in the eastern part of the lagoon (Fig. 1c). This species appears to be the most common seagrass in the survey areas. According to the topography survey that has been carried out by Perera and Siriwardana (1982), extensive areas of the Puttalam lagoon showed soft muddy bottoms. The *Halodule* species is mostly confined to these areas by its rhizome mat with an extensive network of horizontal axis. The wide-leaf variety of *Halodule uninervis* seems to be confined to the relatively deeper areas from 1 m to 1.5 m in depth. The wide-leaf variety of *Halodule uninervis* is comparatively low in abundance. Both varieties of *Halodule uninervis* forms 60% of the seagrass communities in the south western areas (Table III).

Halophila ovalis is also widely spread in the survey areas except in the south western region. This has been observed at depths between 0.5 and 1.5 m. This species is found in areas of muddy substrates. However the density of this species is very low in all four regions of the lagoons and the percentage abundance did not exceed 20%. *Halophila decipiens* is also found in very low quantities and this species is confined only to the north western region of the lagoon.

Enhalus acroides beds were always found in deeper areas such as 1 to 2 meters depth. The abundance of *Enhalus acroides* in the north western and north eastern areas were higher than those of the other species (Table III). It was also observed that the leaf blades of *Enhalus* provide substrata for a large number of micro and macro algae such as *Lorencia* sp., *Hypnea* sp. and *Acanthophora* species. By providing suitable substrata for these photosynthetic organisms, the total primary productivity of the seagrass habitat is substantially increased. These epiphytes form an essential part of the complex food webs that exists in a seagrass community.

Thalassia hemprichii and *serrulata* are also found to be very common except in the Seguwantive area and the south western area. The low abundance of these two species at Seguwantive area may be due to the low salinities prevailing in this area because of the fresh water inlets. Both species have been observed to grow from low water level to a depth of 1.5 meters with a salinity range of 35 to 45 ppt. These two species act as a major substratum for *Gracilaria edulis* which is a commercially important seaweed species.

Cymodocea rotundata is found in all parts of the lagoon but in low abundance (Fig. 1 g). This species is mostly found mixed with *Enhalus acroides*. It also grows in little deeper areas such as 1 to 2 meters of depth. *Syringodium isoetifolium* is found only in the nothern part of the lagoon (Fig. 3 d) and this may be due to its less tolerant character for different habitats. This species is also found in very low abundance compared to other species.

5. Conclusion

Eight species belonging to six genera were recorded during this investigation. *Cymodocea rotundata* was recorded for the first time in Sri Lanka. The distribution pattern of the different species of sea grass beds showed a close association with different salinity values of the lagoon. Traditional fishing methods prevailing in this lagoon show a great threat to the survival of the sea grass communities.

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