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STUDIES ON THE DISTRIBUTION AND STANDING CROP OF ALGAE AT MUTHUPET ESTUARY, TAMILNADU

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Abstract

Studies were made on the occurrence and standing crop of algae from six localities in Muthupet estuary for a period of six months from March to August 1988. Totally 19 algae belonging to the groups Chlorophyta, Phaeophyta, Rhodophyta and Cyanophyta were recorded. The green algae numbered more than other algae in all the stations. The biomass estimated for *Gracilaria verruocsa, Hypnea valentiae* and *Enteromorpha* spp. varied from 905 to 1220 gm/m^2, 740 to 980 gm/m^2 and 53 to 72 gm/m^2 respectively. The maximum standing crop for all these three algae was observed in March. The agar yielding seaweed *G. verrucosa* occurs in large quantity and it could be exploited for the production of agar.

Introduction

Several studies are available on the algae growing in various estuaries and back-waters of India (Biswas, 1932; Parija and Parija, 1946; Mitra, 1946; Krishnamurthy, 1954; Kannan and Krishnamurthy, 1978; Balakrishnan Nair *et al.*, 1982; Jagtap, 1986; Chennubhotla and Kaliaperumal, 1987 and Umamaheswara Rao, 1987). As no information is available on the algae occurring at Muthupet estuary in Thanjavur District, Tamil Nadu, studies were made for a period of six months from March to August 1988 on the composition, distribution and standing crop of algae growing in Muthupet estuary. The data collected on these aspects and hydrological data collected from the study areas are presented in this paper.

Materials and Methods

Muthupet estuary is situated between 10° 20' and 10° 23' N latitude and 79° 34' E longitude. Totally six stations were selected at different places of the estuary for this study (Fig. 1). Algase and water samples were collected at monthly intervals from March to August '88 from all the six stations at 0.3 to 1.0 m depth. The algae collected were sorted out and then identified. Data on the biomass of *Gracilaria verrucosa, Hypnea valentiae* and *Enteromorpha* spp. were collected by harvesting the plants using a 1 sq.m metal quadrat. The mean value for biomass of each species was calculated and the data are expressed as gm/m^2 (wet weight). Data on the atmospheric temperature, surface water temperature, and salinity from all the six stations were also collected.

Results

The algae were found growing either in attached form on different substrata such as pebbles, shells or in free floating condition. The list of species collected and their distribution in six stations are given in Table 1. Totally 19 species in 14 genera of algae were recorded, of which 12

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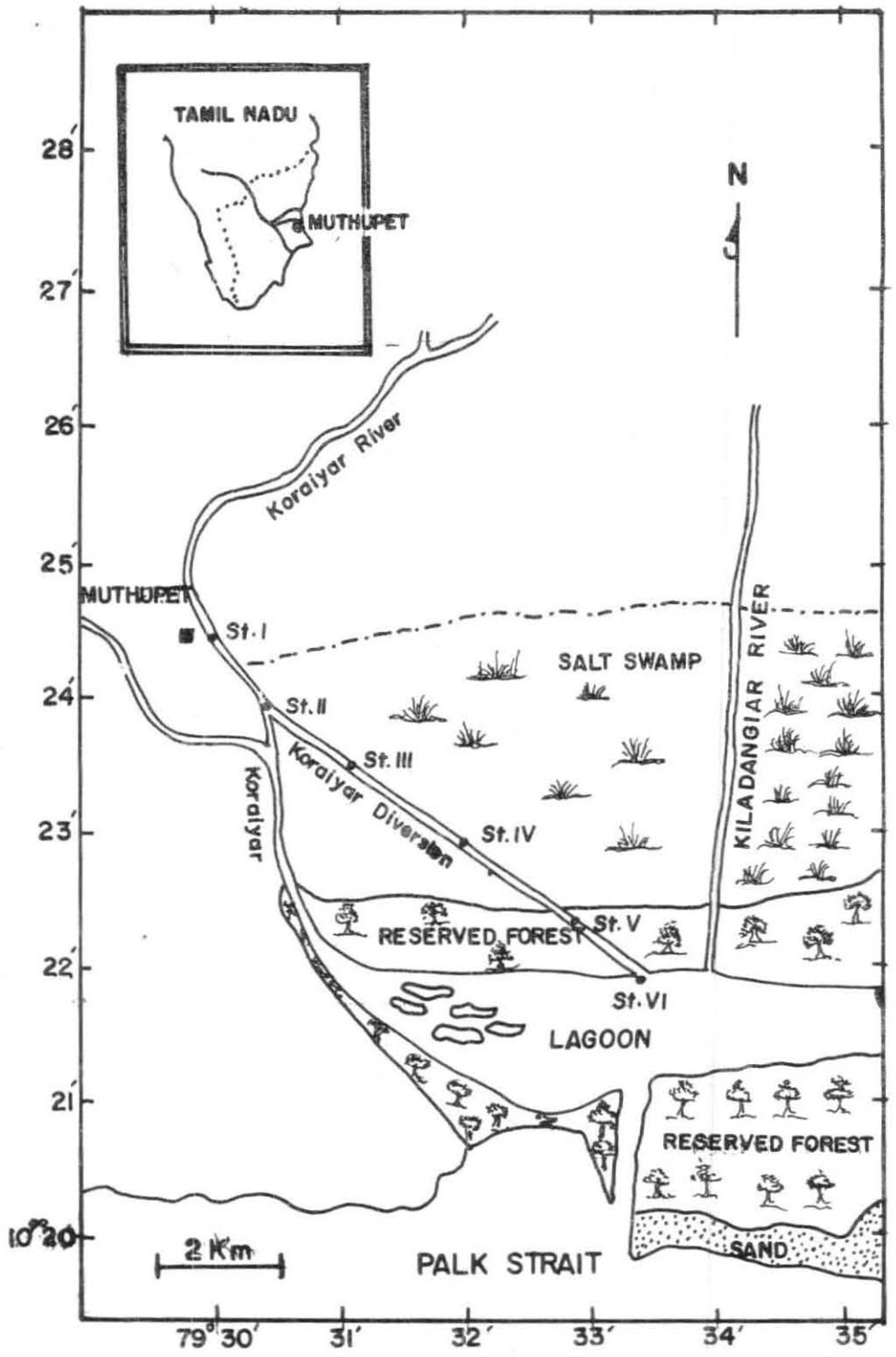


Fig. 1. Map showing the location of Muthupet lagoon and adjacent areas.

Table 1. List of algae occurring at six stations in Muthupet estuary

S.No.	Name of the Algae	Station Number					
		I	II	III	IV	V	VI
	Chlorophyta						
1.	*Enteromorpha compressa* (L) Greville	-	+	+	-	+	+
2.	*E. intestinalis* (L) Link	-	+	+	-	+	+
3.	*E. plumosa* Kuetzing	-	+	+	-	+	+
4.	*E. tubulosa* Kuetzing	-	+	+	-	+	+
5.	*Ulva reticulata* Forsskal	-	-	-	-	-	+
6.	*Chaetomorpha aerea* (Dillw) Kuetzing	+	-	-	+	+	+
7.	*C. linoides* (Ag) Kuetzing	+	-	-	+	+	+
8.	*Cladophora colabense* Boergs	+	+	+	+	+	+
9.	*C. fascicularis* (Mertens) Kuetzing	+	+	+	+	+	+
10.	*Rhzoclonium kochianum* Kuets	+	+	+	+	+	+
11.	**Spirogyra fossa* JAO	-	-	+	+	-	-
12.	**Chara hydropitys* Rech	+	-	-	-	-	-
	Phaeophyta						
13.	*Sargassum wightii* (Greville) J. Ag.	-	-	-	-	-	+
14.	*Turbinaria conoides* Kuetzing	-	-	-	-	+	
	Rhodophyta						
15.	*Gracilaria verrucosa* (Huds.) Papenfuss	+	+	+	-	+	+
16.	*Hypnea valentiae* (Turn.) Mont.	+	-	+	-	+	+
17.	*Caloglossa leprieurii* (Mont.) J. Agardh	-	-	-	-	+	+
18.	*Polysiphonia platycarpa* Boergesen	-	-	-	-	-	+
	Cyanophyta						
19.	*Oscillatoria princeps* Gomont	-	-	+	+	-	-

* Recorded for the first time; + Present; - Absent

species belong to Chlorophyta, 2 species to Phaeophyta, 4 species to Rhodophyta and one species to Cyanophyta. The species compsition varied from station to station with minimum number of 7 species in Station IV and maximum number of 16 pecies in Station VI. Six species of green algae and 2 species of red algae were recorded from Station I. From Station II, 7 species of green algae and one species of red algae were collected. In Station III, 8 species of green algae, 2 species of red algae and one species of blue-green algae were found. Six species of green algae and one blue-green occurred in Staion IV. From Station V, 9 species of green algae and 4 species of red algae wee recorded. Ten species of green algae, 2 species of brown algae and 4 species of red algae were

collected from Station VI (Table 1). Except *Ulva reticulata, Spirogyra rossa, Chara hydropitys* and *Oscillatoria princeps*, all other algae occurred in one station or other durig the entire period of study from March to August '88. Among all the species, *Gracilaria verrucosa, Hypnea valentiae* and *Enteromorpha* spp. occurred in large quantities at Muthupet estuary.

In general, members of the Chlorophyta were more common in all stations. Among the green algae, species of *Cladophora* and *Rhizoclonium* occurred in all stations while *Chara hydropitys* and *Ulva reticulata* occurred only in Station I and VI respectively. The brown algae *Sargassum wightii* and *Turbinaria conoides* were found growing only in Station VI. Among the red algae, *Gracilaria verrucosa* was found in all stations except in Station IV. The blue-green alga *Oscillatoria princeps* was found only in Station III and IV.

The wet biomass estimated for *G. verrucosa H. valentiae* and *Enteromorpha* spp is given in Fig. 2. *G. verrucosa* had a minimum standing crop of 905 gm/m^2 in May and maximum standing crop of 1220 gm/m^2 in March. *H. valentiae* had a minimum biomass of 740 gm/m^2 during June and maximum biomass of 980 gm/m^2 during March. There was no marked variation in the standing crop of *Enteromorpha* sp during different months. However, the maximum biomass of 72 gm/m^2 was seen in March and thereafter there was gradual decrease in biomass with minimum value of 53 gm/m^2 during July and August.

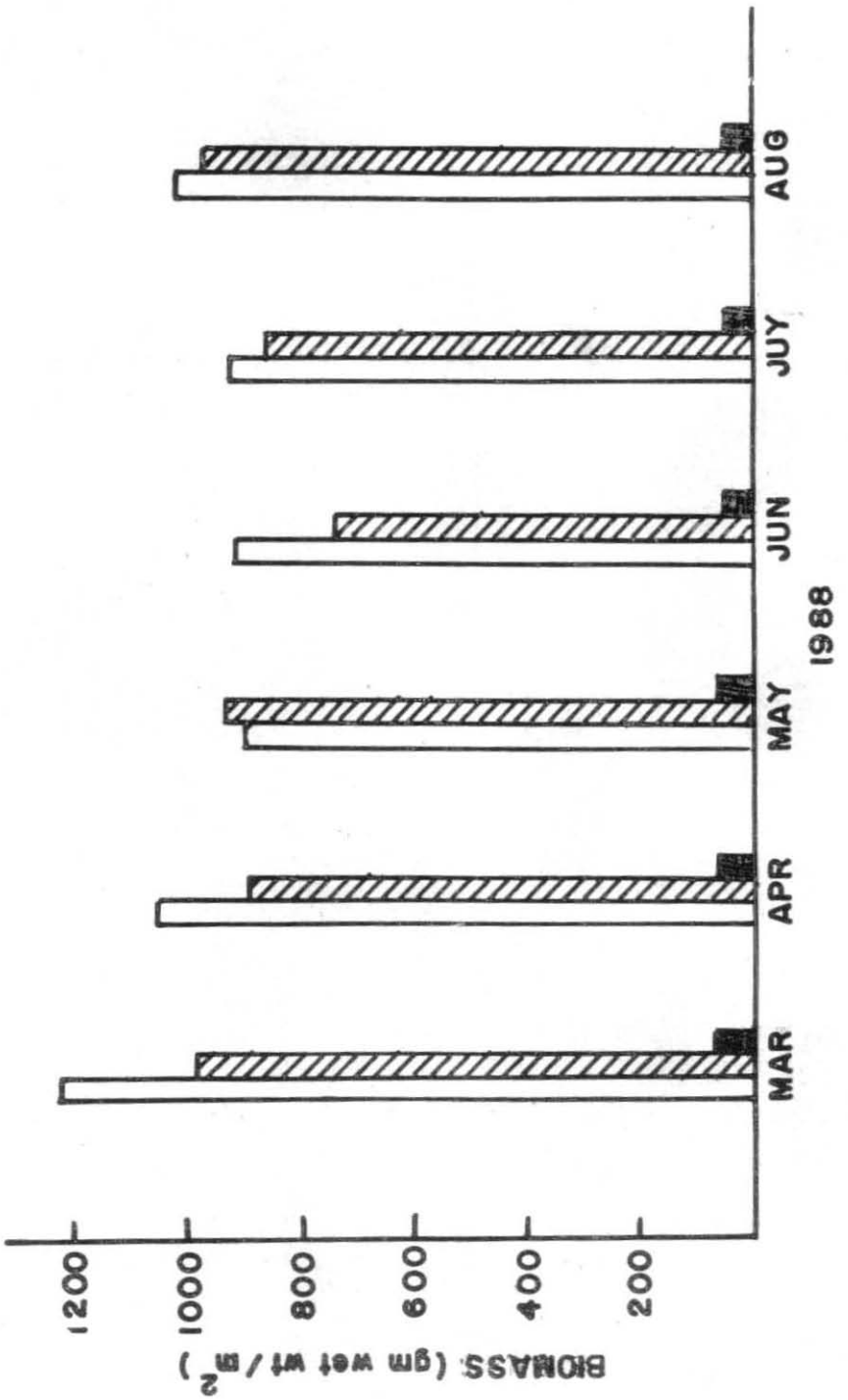
Data was collected on the atmospheric temperature, surface water temperature and salinity of water from all stations from March to August '88. The atmospheric temperature varied from 28° to 36°C and surface water temperature from 25° to 33°C. The salinity ranged from 13% to 40%. In general, during the period of observation the salinty was found low (below 27%) in Station III to VI as these stations are near to the river mouth.

Discussion

In the present study more number of algal species were recorded in Station V and VI than Station I to IV. It may be due to the marine habitat condition prevailing in Station V and VI with higher salinity (30%, and above). It is evident from the occurrence of purely marine plants such as *Ulva reticulata, Sargassum wightii* and *Turbinaria conoides* in Station V and V. The freshwatr alga *Chara hydropitys* occurred only in Station I, where the salinity of the water was 13-14%. The occurrence of *Spargyra fossa* in Station III and IV is remarkable. Species of *Enteromorpha, Chaetomorpha, Cladophora, Rhizoclonium, Gracilaria* and *Hypnea* were found distributed almost in all staions and it shows that these species can tolerate a wide range of salinity.

The number of algal speices recorded from Muthupet estuary in the present study was slightly less than the number of species reported from Chilka Lake in Orissa (Biswas, 1932) and Mandovi-Zuari estuaries in Goa (Jagtap, 1986), but it was found to be more when compared with the number of species occurring in the estuaries and backwaters of Porto-Novo region (Kannan and Krishnamurthy, 1978), Pulicat Lake and Muttukadu backwaters (Chennubhotla and Kaliaperumal, 1987) in Tamil Nadu, Ashtamudi Lake in southern Kerala (Balakrishnan Nair *et al.*, 1982) and Godavari estuary in Andhra Pradesh (Umamaheswara Rao, 1987).

In the present investigation at Muthupet estuary, species belonging to the genera *Enteromorpha, Ulva, Chaetomorpha, Cladophora, Gracilaria, Hypnea, Caloglossa, Polysiphonia*


BIOMASS (gm wet wt / m²)
1200
1000
800
600
400
200
MAR
APR
MAY
JUN
JUY
AUG
1988

and *Oscillatoria* were found growing as reported from different estuaries and backwaters of India (Biswas, 1932; Kannan and Krishnamurthy, 1978; Balakrishnan Nair *et al*, 1982; Jagtap, 1986; Chennubhotla and Kaliaperumal, 1987 and Umamaheswara Rao, 1987). The green algae *Spirogyra fossa* and *Chara hydropitys* collected from Muthupet estuary form the new records on the occurrence of these two plants in estuarine condition in India. However, several genera such as *Pithophora, Protoderma, Phaeophila, Dichotomosiphon, Monostroma, Padina, Rosenvingea, Chnoospora, Catenella, Bostrychia, Grateloupia, Ceramium, Centroceras, Herposiphonia, Acanthophora, Phormidium, Lyngbya, Microcoleus, Spirulina, Schizotrix* and *Anabaena* were not recorded in Muthupet estuary while these have been reported from different estuaries and backwaters of India (Biswas, 1932; Krishnamurthy, 1954; Kannan and Krishnamurthy, 1978; Chennubhotla and Kaliaperumal, 1987 and Umamaheswara Rao, 1987).

The informaiton gathered on the seasonal changes in the standing crop of *G. verrucosa, H. valentiae* and *Enteromorpha* spp shows that maximum biomass of these plants occur during the month of March. It is approximately estimated that 4000 tonnes (wet wt) of *G. verrucosa* occurs in the area between Station I and VI in Muthupet estuary and it could be exploited for the production of agar in India.

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Literature cited

Baakrishnan Nair, N., V. Sobha and M. Arunachalam 1982 Alagae from southern Kerala coast. Indian J. mar. Sci., 11 (3): 266-269

Biswas, K. 1932 Algal flora of the Chilka Lake. Mem. asiat. Soc. Bengal., 11 (5): 165-198

Chennubhotla, V.S.K. and N. Kaliperumal 1987 Marine algal flora from selected centres along the Madras coast. Mar. Fish. Infor. Ser. T & E Str. No.72, Page 19 Jagtap, T.G. 1986 Studies on the associated flora of the mangrove environment *Proc.* Natl. Symp. Biol. Util. cont. Mangroves, Kolhapur. pp. 180-187.

Kannan, L. and K. Krishnamurthy 1978 A survery of the algae of the Porto-Novo region (Coromandel coast, Bay of Bengal). Seaweed Res. Utiln, 3 (1&2): 1-4

Krishamurthy, V. 1954. Ecology and seasonal succession of the algal flora of a salt marsh at Madras J Madras Univ., B. 24:161-178.

Mitra, G. 1946. Development of Chilka Lake, Cuttack

Parija, P. and B. Parija 1946. Algal succession on a rocky island named Charai Guha in the Chika Lake J Indian bot. Soc. (M.O.P. Iyengar Commem. Vol) pp. 375-379

Umamaheswara Rao, M. 1987 Algae of Indian estuaries J. mar. biol. Ass. India, 29 (1&2): 1-9.