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NOTES AND NEWS

STANDING CROP OF MACROALGAL IN MANGROVE HABITAT OF SANDSPIT AREA, KARACHI

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Numerous studies have been carried out on marine epilithic algae of shores of Karachi and vicinity (see Shameel and Tanaka, 1992 for review), however, those dealing with mangrove habitat are extremely few. Saifullah and Nizamuddin (1977) described members of order Ulvales from muddy habitat of Sandspit area and backwaters of Karachi. Recently Tanaka and Shameel (1992) and Saifullah and Taj (1995) studied epiphytic algae on pneumatophores of *Avicennia marina* (Forssk.) Vierh. growing in the same area.

The importance of marine algae growing in mangrove habitat need not be overemphasized, as they form a very important component of the mangrove ecosystem and contribute significantly to its energy budget. These algae, although very much smaller in size than mangrove plants, may fix as much or even more solar energy because of high turnover rate (Rodriguez and Stoner, 1990). It is very ironical that no one has as yet estimated the standing crop of such important organisms in the area of study, what to speak of their primary productivity.

The present work was carried out again in the Sandspit area, but this time we have tried to measure the standing crop of the macroalgae residing in the muddy habitat of the mangrove stands.

Samples of algae were collected from Sandspit (lat.24°48'N; long.66°59'E), a locality 20 km away from centre of Karachi city, which forms the westernmost part of the Indus Delta mangrove ecosystem. It offers a rare example where two entirely different habitats occur very close to each other separated by a very narrow sandy bar. On one of its side lies high energy sandy beach with strong wave action while on the other there is a sheltered habitat with dense growth of the mangrove *Avicennia marina* (Forssk.) Vierh. The habitat here is very muddy and stagnant, representing backwaters of Karachi Harbour, the open muddy spaces within which offer suitable sites for dense growth of green algal forms (Saifullah and Nizamuddin, 1977).

The algae were collected from three stations within the mangrove habitat facing Shore Laboratory of Centre of Excellence in Marine Biology, approximately 150 meters apart from each other. Samples were collected monthly but sometimes fortnightly, from as many as fifteen quadrats (25 x 25 cm) on a single occasion during the period September 15th, 1994 to February 2nd, 1995 which includes the transition period and northeast monsoon season. Macroalgae were carefully scooped off the substrate and thoroughly washed with water to remove any traces of mud present. They were then

squeezed with hand to get rid of as much water as possible and then weighed (Krishnamurthy *et al.*, 1967; Michanek, 1967). Specimens were also fixed in 10% formalin for identification of the taxa. Simultaneous to algal collections, salinity and temperature of seawater were also measured employing a refractometer and thermometer respectively.

Water temperatures ranged between 21°C and 34°C with a decreasing trend from September to February (Table 1). Salinity values, however, did not show any regular pattern (Table. 1), and ranged between 30 ppt and 39 ppt.

Table 1. Variation in temperature and salinity values of seawater in the study site during the period of study.

Date	Salinity (ppt)	Temperature (°C)
15.09.94	30	34
05.10.94	39	33
31.10.94	39	32
29.11.94	38	30
30.12.94	37	21
03.01.95	39	22
25.01.95	39	29
23.02.95	39	24

In all, four species belonging only to order Ulvales of Chlorophyta were recorded. They were *Ulva reticulata* Forssk., *U. sorensenii* Chap., *Enteromorpha compressa* (L.) Greville and *E. intestinalis* (L.) Link. *U. reticulata* was the most dominant and others were comparatively negligible. They float on water and form a floating community at high tide but reside on mud during low tide. Saifullah and Nizamuddin (1977) also reported their occurrence in the area.

Mean values of algal fresh weight at each station and their overall means increased continuously during the period of study from a low value of 390.4 g m-2 in September to a high value of 1593.4 g m-2 in February 1994 (Table 2, Fig. 1) which indicates a preference of lower temperatures favourable by the algae for their growth. Anand (1940), Saifullah and Nizamuddin (1977) and Qari and Qasim (1988) also reported

Table 2. Overall mean ($gm.m^{-2}$) values SE of standing crop of macroalgae (wet weight) in backwaters of Sandspit area, Karachi.

Date	15.09.94	05.10.94	31.10.94	29.11.94	30.12.94	25.01.95	23.02.95
Mean algal wet weight ±SE	390.4 ±80.6	353.28 ±69.20	450.24 ±47.50	950.4 ±105.9	1285.28 ±46.50	1104.80 ±79.54	1593.40 ±139.45

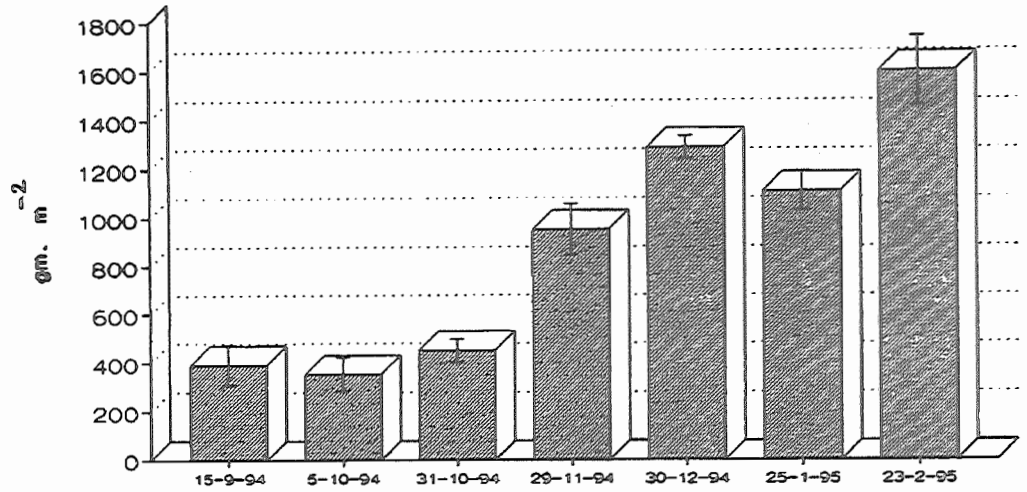

Fig.1. Variation in mean values of standing crop of macroalgae (wet weight gm.m^{-2}) during the period of study. Top bars indicate standard error (S.E.).

maximum growth of intertidal algae on the rocky shores of nearby Manora Island and Buleji during the winter season, which is the northeast monsoon period in the region. In the neighbouring area of Runn of Kutch of India, Chauhan and Krishnamurthy (1968) also noted a winter maximum algal growth.

The standing crop of these algae is greater than intertidal algae of the nearby exposed Buleji area (Saifullah, 1973), which indicates sheltered areas are suitable for abundant growth of green algae belonging to the order Ulvales (Nasr, 1947; North *et al.*, 1972 and Saifullah and Nizamuddin, 1977).

Mangroves grow profusely all along the coast of Indus Delta region and occupy an area as big as 249,486 hectares (Snedaker, 1984). Exposed muddy areas within and adjacent to this area are covered with dense growth of green algae at low tide, especially during the winter season when one can see large expanses of green algal mats spread all over the area. It is unfortunate that nobody has as yet estimated their quantum. Nevertheless, a premature rough estimate based on present observation puts the figure to thousands of tons of algae produced each year in the delta. A satellite remote sensing study along with extensive ground surveys are very much needed to estimate this accurately.

In view of the overwhelming role of macroalgae in the mangrove ecosystem already mentioned, it is imperative that these forms receive proper attention by ecologist in the Indus Delta region, where mangroves are fast deteriorating as a result of hypersalinity and other anthropogenic stresses (Snedaker, 1984 and Saifullah, 1982). The sustainable yield of these algae may also be used for commercial exploitation like poultry feed and fish meal supplement, fertilizer, medicines etc., which has never been tried in the country.

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