

Cultivation of *Gracilaria lichenoides* in Puttalam Lagoon

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SEAWEEDS in Sri Lanka are mainly utilised for the production of commercially important products agar and alginic acid. Agar is an algal polysaccharide obtained from red seaweeds whereas alginic acid is extracted from brown seaweeds. The commonest agarophytes of Sri Lanka are *Gracilaria confervoides* and *Gracilaria lichenoides*. Since these two seaweeds are found in appreciable quantity they are utilised for the production of agar in this country. *Gracilaria confervoides* has been found to contain about 40% agar of the grade II quality on the Japanese scale while *Gracilaria lichenoides* has 20% agar on grade II quality (Durairatnam, Grero and Wimalasiri 1972). *Gracilaria confervoides* is abundant in Trincomalee area from Kinniya to Gangai. *Gracilaria lichenoides* is found in Puttalam Lagoon, Kalpitiya, Mannar and in some islands off Jaffna. (Durairatnam and Medcof 1958).

Denudation of these seaweeds has resulted due to unrestricted harvesting for export. Further our sea seaweed vegetation is rich in quality but not in quantity. Therefore it is necessary, at this stage to carry out culture experiments to cultivate seaweeds on artificial substrata. This could provide a continuous supply of raw material for the proper utilization of them. Cultivation of seaweeds on artificial substrata has been practiced long ago in countries like Japan, Indonesia and Australia. Attempts are now made to carry out culture experiments in Sri Lanka. This paper reports on the observations made on the cultivation of *Gracilaria lichenoides* in Kalpitiya area in Puttalam Lagoon.

Gracilaria lichenoides is a red alga, usually profusely branched and the branches are cylindrical, gradually attenuating to a sharp point. Plants vary in colour from pale green to creamish white, becoming purple on drying. It grows submerged in tufts, attached to small rocks and other solid objects. Growth in this plant is apical. Mature plants usually grow to a height of 40-50 cm. It propagates vegetatively by fragmentation and by means of tetra spores. Propagation by vegetative fragmentation is much easier and quicker.

Among its different localities *Gracilaria lichenoides* is found in plenty in Kalpitiya area in Puttalam lagoon. The alga grows well in the calm, undisturbed area of the lagoon protected from the open sea. During the period from November to June, due to wave action these plants are detached and cast ashore. Kalpitiya was selected as the site for cultivating this alga since this area is shallow with sandy bottom. Scattered in this area, especially in the near vicinity of the island Pulluppiddy are luxuriant growth of this seaweed.

Recently cultivating seaweeds on coir ropes has been practised in India. Raju and Thomas (1971) have cultured *Gracilaria edulis* in a sandy lagoon on coir ropes suspended in water. Umamaheswara Rao (1974) used coir net frames to culture this seaweed instead of coir ropes, which

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could provide more support to plants. In this experiment the coir net frame method was employed. Coir net frames of 1 × 1 m size were made and tied to bamboo poles which were planted in water. The coir rope frame was fixed at a level, about one foot below the water level. This was maintained throughout the period of the culture experiment. Healthy growing *Gracilaria lichenoides* were collected and fragments of 2 cm. removed from the apical parts of the plant were used as the propagating material. These 2 cm. fragments were inserted in the twists of coir ropes at an interval of 5 cm. The experiment was started on the 1st of April, 1975. Ten plants selected on the coir frame at random were marked, to study their rate of growth in terms of the length of plants. The following table gives the length of plants on a nearly monthly observational basis.

TABLE I

Length of plants measured in cm.

Plant No.	Length of plants on 6.5.75	Length of plants on 28.5.75	Length of plants on 8.7.75
1	11.2	19.1	29.7
2	9.6	18.6	27.5
3	8.1	16.7	25.6
4	7.6	14.9	21.2
5	9.2	16.2	27.8
6	8.7	19.3	30.1
7	9.1	21.4	29.6
8	10.6	17.1	26.7
9	11.1	16.7	31.2
10	8.9	15.4	26.1
Average	9.41	17.74	27.55

The fresh and dry weights of seaweeds were determined by removing the algae from one square meter area of coir frame after air drying and sun drying respectively. Table II shows the rate of growth of alga in terms of length, fresh weight and dry weight.

TABLE II

Growth rate of alga in terms of length fresh and dry weights

Date of commencement of experiment	..	1.4.1975
Date of Harvest	..	8.7.1975
Average length of 10 plants at the time of harvest	..	27.55 cm.
Fresh weight of plants at time of harvest	..	2.785 kg./sq. m.
Dry weight of plant at the time of harvest	..	0.079 kg./sq. m.

The plants grown on coir ropes were found to grow more luxuriently and were more greenish in colour. In addition the plants were free from extraneous matter, such as sand and other calcareous deposits. The observation in this field experiment is that the plants have attained a length of 26-32 cm. in 97 days with an average growth rate of 0.285 cm./day. Further from the freshweight of alga it is also evident that about 5-6 lbs. wet weight of *Gracilaria Lichenoides* could be obtained per square meter area of coir net. This clearly indicates that the regenerating power in this plant is high and it grows rapidly by vegetative means to harvestable size in 3-4 months.

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