

SEAWEED RESOURCES AND THEIR USES IN SRI LANKA

P. M. A. JAYASURIYA

National Aquatic Resources Agency

Introduction

Seaweeds are macroscopic algae, which form an important component of the marine living resource. Based on their pigmentation, the seaweeds are broadly grouped into green, brown, red and blue green algae. Sri Lanka has a coast line of approximately 1700 km along which many varieties of marine algae are found. About 340 sea weed species belong to different families have been identified in Sri Lanka by several Scientists (Durairatnam, 1961). Few species belong to the groups of red, brown and green algae are economically important as food and as a source of industrial chemicals such as agar - and alginates.

Several surveys were carried out along the coastal areas of the island on seaweeds with a view to utilizing those of economic importance. These investigations revealed that there were many species of algae in the west coast of Sri Lanka (Figure 1) but very few in the east coast since the coast is made up of long sandy beaches and sheltered bays.

The common genera native to Sri Lanka that could be of economic importance are *Gracilaria*, *Celidium*, *Sargassum*, *Turbinaria*, *Ulva* and *Caulerpa*. The first two genera are belong to the red algae group and they are important as a source of agar - agar. *Sargassum* and *Turbinaria* belong to the brown algae and they are also valuable sources for alginates which will be used mainly in the textile industry. *Ulva* and *Caulerpa* are in the group of green algae and they can be directly used as human food since they have high nutritive values.

Gracilaria spp. and Their Utilization

Two varieties of seaweeds known as "Ceylon moss" namely *Gracilaira adulis* and *Gracilariaverrucosa* are common in Kalpitiya, Mannar and Trincomalee areas. *Gracilaria* spp. have been exported from Sri

Lanka since 1800 s. Exports to England of dried bleached "Ceylon moss" (*Gracilaria* spp.) has approximated to 5,700 lbs in 1831 and 15,000 lbs in 1840 where it was sold at 09 dollars/lb. In 1930's Ceylon moss was reported from gulf of Mannar, Puttalam lagoon and from Ponparippu to Kallar. During that period people used to gather it by means of hooks attached to lines. It was dried in the sun, left over night in the dew which is said to bleach it more effefively than the sun.

During 1941 to 1944 an estimated 20,000 lbs. of seaweed was exported to India annually. After the war this export trade ceased but a few people in those areas continued to collect bleach and supply small quantities to the local market. In 1950's trade of exporting *Gracilaria* picked up again because of the strong demand from Japanese buyers.

In late 1960's due to a drop in quality standards of these Sri Lankan *Gracilaria* exports, mostly due to the deliberate adulteration of the product the trade was completely stopped for some time.

In the 1970's annually about 50 to 100 tons of dried *Gracilaria* were exported from Sri Lanka. The quantity exported in 1972 was around 50 tons and in 1986 this was increased up to 100 tons.

At present the *Gracilaria* industry is geared to the export of dried weed without any processing. The fishermen living in Kalpitiya and Trincomalee areas are mainly involved in collecting these *Gracilaria* plants. Seaweed collecting start as when orders are received from the local agents who represent export companies based in Colombo. Two collectors can collect a boat load of fresh sea weed weighing around 200 kg with dry weight of around 30 kg. These collected seaweed are unloaded on the beach and is allowed to sun dry for 4-5 days. Even though some

cleaning is done by the collectors during sun drying, further cleaning is carried out at the purchasing centers. Here the weeds are sifted through a table model wire mesh sieve to remove particulate matter such as sand and seashells. The dried weed is further cleaned by the exporters prior to bailing for shipment.

A very small percentage of the dried weed is sold locally. Retail packs, weighing 50 or 100 gms. are sold at most supermarkets pharmacies and groceries in Colombo and suburbs. According to most Colombo traders, packeted *Gracilaria* is a "slow moving" item except during the Islamic festive season, when there is a good demand for the weed. Most people use this weed to make a drink or to make a kind of jelly.

Gracilaria is a popular item of food among fishermen in producer areas. A recent socio-economic survey carried out by NARA has revealed that 9 out of 10 people living the Puttalam lagoon area use *Gracilaria* for domestic consumption. The most popular preparation is a porridge made out of this weed. The dried weed is washed several times cooked in water for 5-20 minutes and the thick soup obtained is sieved using a cloth strainer. Coconut cream and lime is added to taste. The villagers believe this porridge to be highly nutritious and is considered a must during the fasting season. The porridge is sold at kiosks in the Kalpitiya area at Rs. 2.50 a glass.

Seaweed "Jelly cube" is another common food in this area. Seaweed is washed several times till it becomes lighter in colour and is cooked in a little water with some lime juice sieved through a cloth strainer. Sugar, vanilla and colouring are added to the syrupy mass obtained which is then allowed to set for about an hour to a jelly like mass. The jelly is then cut in to cubes.

Sargassum spp. and Their Utilization

In Sri Lanka interest in brown seaweeds grew in the 1960's. *Sargassum* and *Turbinaria* are the economically important genera of brown seaweed found in Sri Lanka.

A quantitative survey carried out by Dr. Durairatnam on *Sargassum* revealed that about 800 tons of wet weed could be harvested along the south west coast.

During this survey the following species of *Sargassum* and allied genera were identified.

Sargassum cervicone (Grev) Grun.
Sargassum cristaeifolium J. Ag.
Sargassum cinereum J. Ag.
Sargassum ilicifolium (Turn) J. Ag. forma
Sargassum swartzii (Turn) J. Ag.
Sargassum wightii (Grev)
Sargassum tenerrimum J. Ag.
Cystophyllum muricatum (Turn) J. Ag.
Turbinaria ornata J. Ag.

The first two species were found between Ambalangoda and Galle while the others were found between Mannar and Jaffna. The dominant species in the southern coast is *Sargassum cervicone* (Graville).

The main economic use of brown algae is the production of alginic acid. The main use of alginic acid in Sri Lanka is in the textile industry.

In 1973 Industrial Development board of Sri Lanka commenced a pilot project to produce liquid sodium alginate. The product was meant to be used by the National Textile Corporation as a mordant in dyes for textile finishing. The total investment and cost for this project was estimated and the annual production of alginic acid was estimated at around 3000 kg.

This project had to be abandoned due to the limited availabilities of natural stocks of raw material, *Sargassum cervicone* which gives the highest yield, and difficulties in finding the required quantities of the weed in shallow areas. This weed is generally found in deeper areas of the reef.

At present *Sargassum* based products are not manufactured in Sri Lanka in spite of the availability of fairly large quantities of the weed.

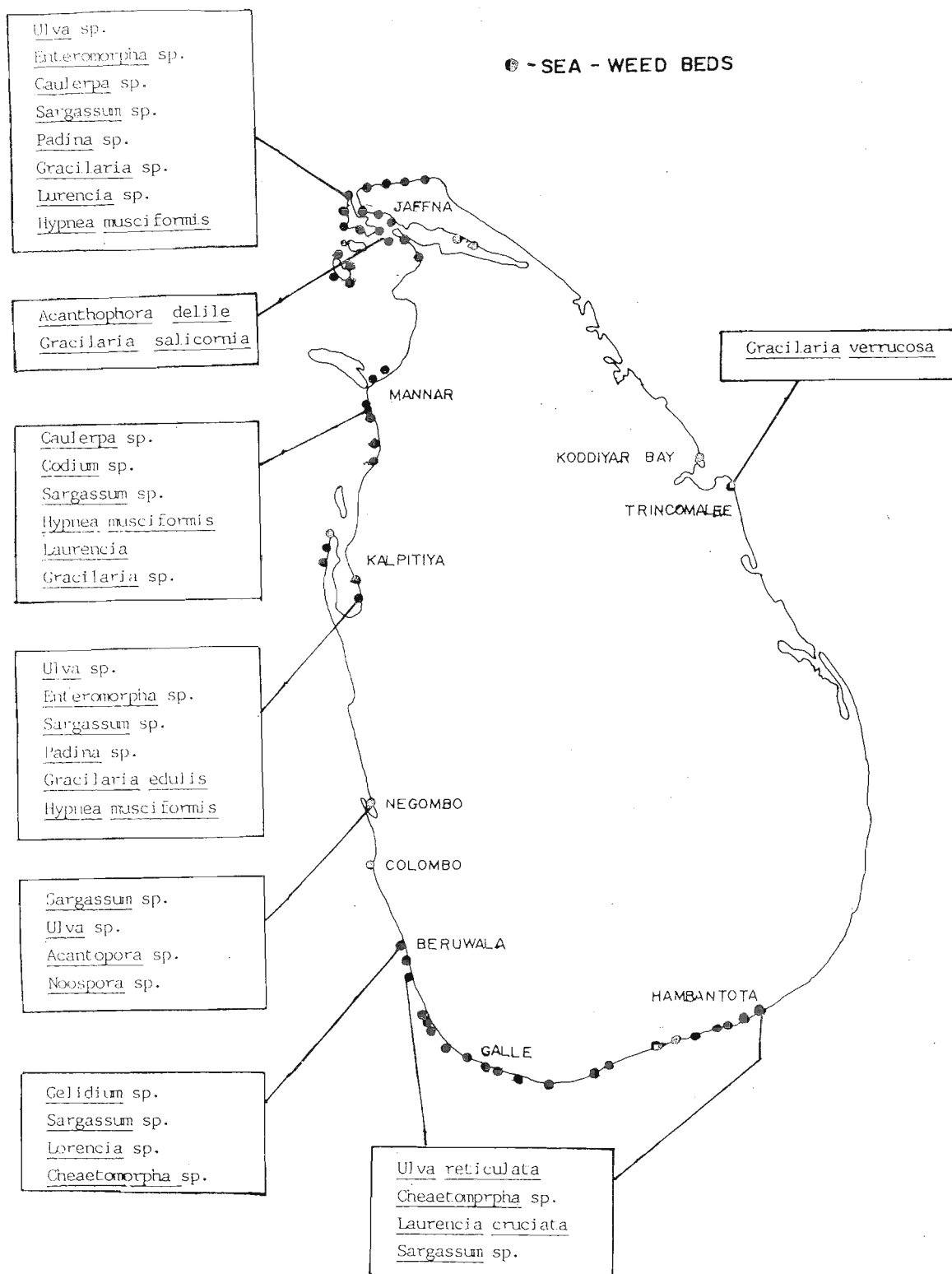


Figure 1: Distribution of seaweed beds of commercial importance in Sri Lanka.

Sea Weed as a Source of Food

Fresh, dried and processed seaweeds are utilized for human consumption. Some green and red seaweeds such as *Ulva fasciata*, *U. rigida* and *Acantohopora* contain very rich proteins. These algal proteins have many essential amino acids including iodine containing amino acids. Studies revealed that these seaweeds contain 16-30% of protein on dry weight basis and this amount is somewhat higher than that in other food materials such as cereals, eggs and fish. Among the green algae the sea lettuce or green laver (*Ulva lactuca*) used to be eaten mainly in Scotland area as a salad, but it has also been used in soups (Chapman, 1970).

Some of the edible seaweeds occurring along the coast of Sri Lanka are species of *Ulva*, *Chaetomorpha*, *Caulerpa*, *Codium*, *Gracilaria*, *Hypnea*, *Turbinaria*, *Acanthopora* and *Laurencia*. Species of *Ulva* and *Caulerpa* can be eaten raw as salads by adding some sauce and lime juice. Some of the people in the southern coastal areas in Sri Lanka used to consume *Ulva lactuca* as a curry with other green vegetables.

Seaweed can also be used as animal feed for cattle, poultry and other farm animals. Seaweed meal can be obtained by grinding cleaned and washed seaweeds such as *Ulva*, *Enteromorpha*, *Sargassum*, *Padina*, *Gracilaria* and *Hypnea*. In 1970's attempts were made to popularise the incorporation of dried

powdered *Ulva* spp. as a green supplement for poultry feed in place of imported alfa-alfa preparations. Laboratory studies gave encouraging results with seaweed preparations showing promising results. However the research and developmental activities on this subject was abandoned with the influx of cheaper feed material.

Limiting Factors and Constraints for Utilization

Even though there are 340 species of seaweed growing in the coastal waters of Sri Lanka nearly 20 species are of commercial interest. Out of these only two species of *Gracilaria* (Ceylon moss) are of commercial importance at present.

The under utilized nature of the country's seaweed resources could be attributed to several limiting factors and constraints such as lack of resource data and difficulties in collecting and marketing of seaweed resources and as well as the low popularity exists for seaweeds as food among Sri Lankans.

References

- CHAPMAN, V.J. (1970) Seaweeds and their uses. Methuen & Co. II New Fetter Lane. London E C4.
- DURAIRATNAM, M. (1961) Contribution to the study of marine algae of Ceylon. *Bull. Fish. Res. Stn. Ceylon*. 10 : 5 - 117.