

SEAWEED RESOURCES OFF TAMIL NADU COAST, SECTOR - IV KILAKKARAI - RAMESWARAM ISLAND (DHANUSHKODI)

K.Rama Rao, P.V.Subba Rao, P.C.Thomas

S.H.Zaidi and K.Subbaramaiah

CSMCRI - Marine Algal Research Station, Mandapam - 623 518

and

N.Kaliaperumal, S.Kalimuthu, K.Muniyandi

J.R.Ramalingam, N.Najmuddin & V.S.K.Chennubhotla*

Mandapam Regional Centre of CMFRI, Mandapam Camp

Marine Fisheries 623 520

Abstract

Survey of the deep water area from Kilakkarai (Appa Tivu to Rameswaram Island (Dhanushkodi) was undertaken from December 1990 to January 1991 in the IV Sector survey of Deep water Seaweed Resources off Tamil Nadu coast, which formed the last phase of the survey from Rameswaram to Kanyakumari carried out during 1986-91. An area of 417.5 sq.km. was surveyed yielding a total biomass of 18,162.5 tons (wet) seaweeds. Out of 167 stations surveyed in 13 transects, vegetation occurred only in 12 stations. Of the 29 species of marine algae recorded 8 belonged to Chlorophyta, 8 to Phaeophyta, 12 to Rhodophyta, and 1 to Cyanophyta, One species of seagrass *Cymodocea serrulata* was also recorded. Twenty species were found in estimable quantities, of which the following 8 species were abundant : *Halimeda macroloba*, *Spatoglossum asperum*, *Zonaria crenata*, *Sargassum ilicifolium*, *Amphiroa fragilissima*, *Hypnea musciformis*, *Botryocladia leptopoda* and *Lyngbya majuscula* with a biomass of 1325, 9775, 650, 1550, 1925, 300, 862.5 and 1012.5 tons (wet) respectively. The species of *Hypnea* and *Sargassum* could be exploited for the manufacture of phytochemicals.

* Present Address : Principal Scientist and Officer-in-Charge

Minicoy Research Centre of CMFRI, MINICOY - 682 559.

Union Territory of Laksha deep.

Introduction

The area between Kilakkarai and Rameswaram in southeast coast of Tamil Nadu forms a nodal region for commercial exploitation of economic seaweeds for the indigenous phycocolloid industry. The seaweeds in this region are over exploited and already the species like *Gelidium* and *Gracilaria* were depleted in their resources. The earlier resources estimates of this region were confined to drift seaweeds (Krishnamurthy *et al.* 1967) and seaweeds occurring in shallow waters (Varma and Krishna Rao, 1962; Umamaheswara Rao, 1969, 1972 a,b and 1973; Anon 1978). Since there has been a rapid depletion of the natural resources of seaweeds and the seaweed industry facing acute shortage of raw material, a dire necessity had arisen to assess the seaweed resources of deeper waters beyond 5 m depth in this region. Consequently an elaborate and systematic survey of seaweed resources off Tamilnadu coast from Kanyakumari to Rameswaram was undertaken as a joint venture by CSMCRI and CMFRI in a phased manner, dividing the coastal region between Rameswaram and Kanyakumari into four sectors. The earlier sectors I to III were from Kilakkarai to Kanyakumari and the present paper deals with the survey of last phase designated as fourth sector between Kilakkarai and Rameswaram and it was carried out during December 1990 and January 1991.

Materials and Methods

The method of survey for this sector was the same as described by Chennubhotla *et al.* (1990). The area surveyed from Kilakkarai to Rameswaram lies between longitude 78°53' - 79°29'E and latitude 09°06' - 09°14' N. The seaweeds and seagrass samples were collected by "Scuba" diving technique from each sampling station fixed at every 500 m intervals along the transects upto a maximum depth of 21 m. The horizontal distance between two transects was 5 km. The samples were sorted out into different species of seaweeds and seagrasses and their fresh weights were determined.

The survey was conducted over an area of 417.5 sq.km. extending from Kilakkarai (off Appa Island) to Rameswaram Island (off Dhanushkodi). The area was covered in 13 transects and the number of sampling stations along the transects varied from 7 to 16. The depth of the sampling stations ranged from 5 to 21 m. The substratum in most of the sampling stations was sand and / or mud. At a few stations it consisted of rock alone supporting good vegetation. The standing crop value (fresh weight) of seaweeds obtained from 1 sq.km. area at the sampling station was computed to 2.5 sq.m. area taking into consideration the area covered on all sides from each sampling station. Estimates for all sampling stations with seaweed growth were

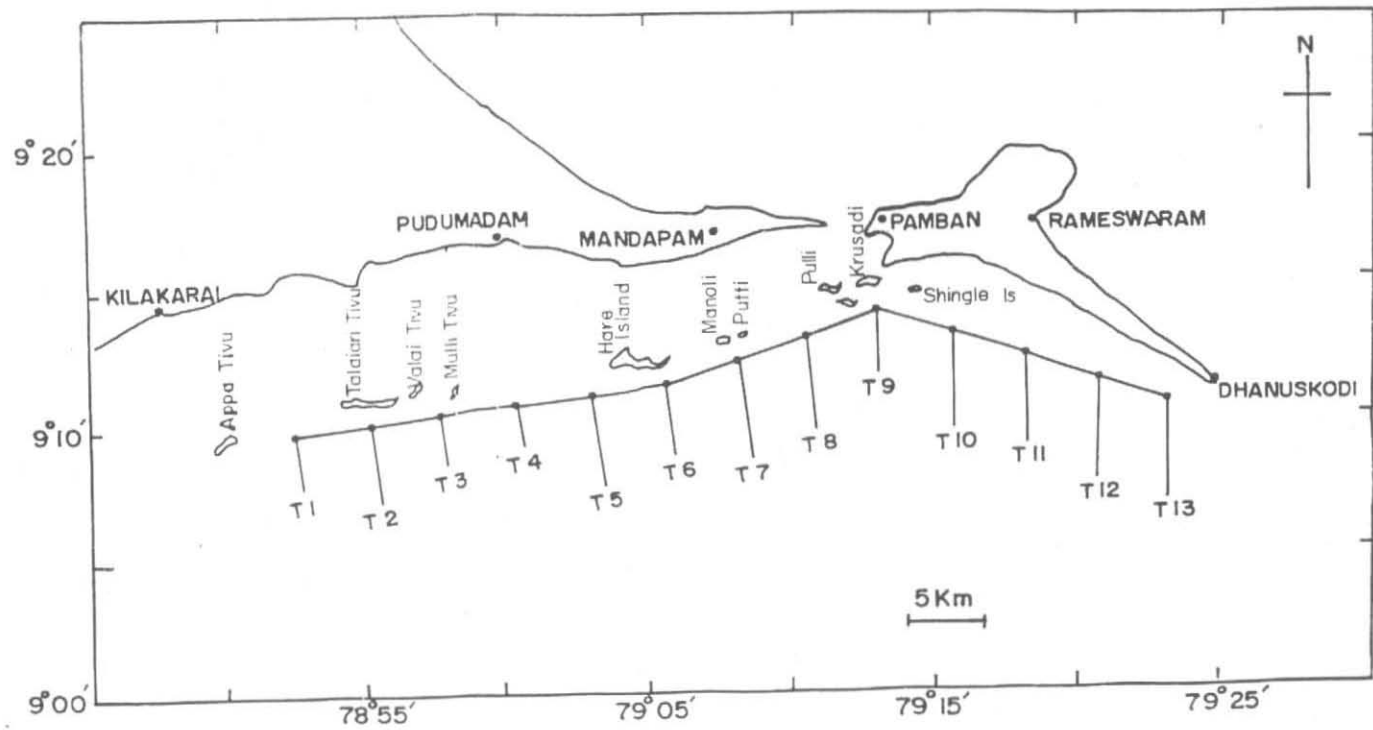


Fig. 1. Map showing the location of transects in the area surveyed from Kilakkarai to Rameswaram Island.

Table 1. ESTIMATED STANDING CROP OF SEaweEDS COLLECTED FROM THE COAST KILAKKARAI TO RAMESWARAM ISLAND (DHANUSHKODI)

S.No.	Species	Transect number and wet weight (tonnes)						Total standing crop (wet) wt.in tonne
		T-2	T-3	T-4	T-6	T7	T-8	
	GREEN ALGAE							
1.	<i>Chaetomorpha linoides</i>	-	25.0	-	-	-	-	25.0
2.	<i>Caulerpa fergusonii</i>	-	-	12.5	-	225.0	-	237.5
3.	<i>C. taxifolia</i>	-	-	-	12.5	-	-	12.5
4.	<i>Halimeda macroloba</i>	-	250.0	-	250.0	400.0	425.0	1325.0
	BROWN ALGAE							
5.	<i>Dictyota dichotoma</i>	-	-	-	50.0	-	-	50.0
6.	<i>Spatoglossum asperum</i>	-	-	-	1450.0	-	8325.0	9775.0
7.	<i>Zonaria cronata</i>	-	-	-	-	550.0	100.0	650.0
8.	<i>Hormophysa triquetra</i>	-	-	-	75.0	-	-	75.0
9.	<i>Sargassum ilicifolium</i>	-	125.0	-	-	1425.0	-	1550.0
10.	<i>S. piagiphyllum</i>	-	-	-	12.5	-	-	12.5
11.	<i>S. wightii</i>	-	125.0	-	-	-	-	125.0
	RED ALGAE							
12.	<i>Chondrococcus hornemanni</i>	-	-	-	-	12.5	-	12.5
13.	<i>Amphiroa anceps</i>	-	-	-	-	25.0	-	25.0
14.	<i>A. graeilissima</i>	-	250.0	375.0	725.0	75.0	500.0	1925.0
15.	<i>Jania adhaerens</i>	-	-	-	87.5	12.5	-	100.0
16.	<i>Halymenia venusta</i>	-	-	-	75.0	-	-	75.0
17.	<i>Hypnea musciformis</i>	100.0	-	125.0	75.0	-	-	300.0
18.	<i>Botryocladia leptopoda</i>	437.5	250.0	-	175.0	-	-	862.5
19.	<i>Neurymenia fraxinifolia</i>	-	12.5	-	-	-	-	12.5
	BLUE GREEN ALGAE							
20	<i>Lyngbya majuscula</i>	25.0	750.0	-	187.5	-	50.0	1012.5

Fig. 3. Standing crop of most abundant seaweeds in order of their abundance.

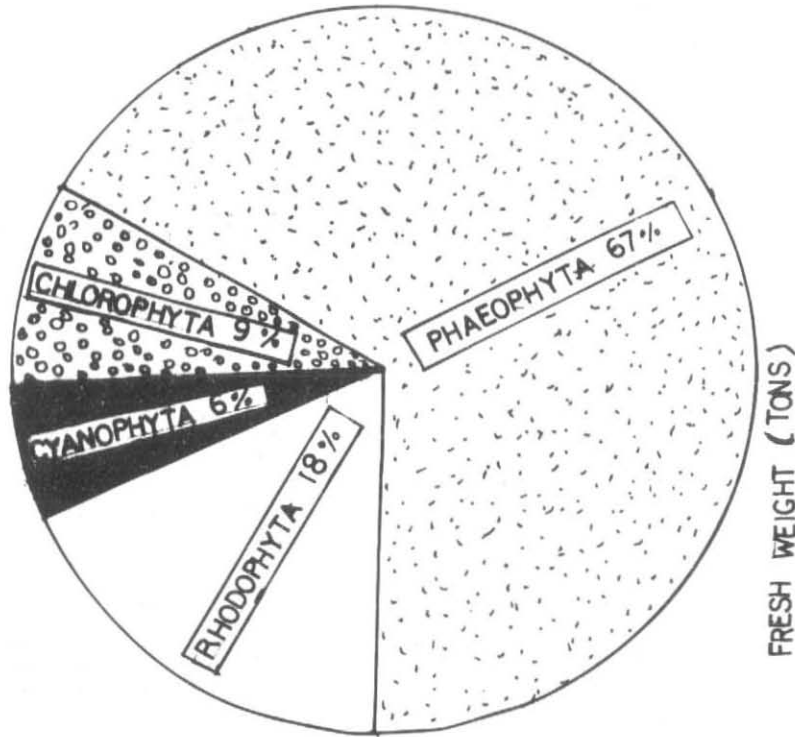
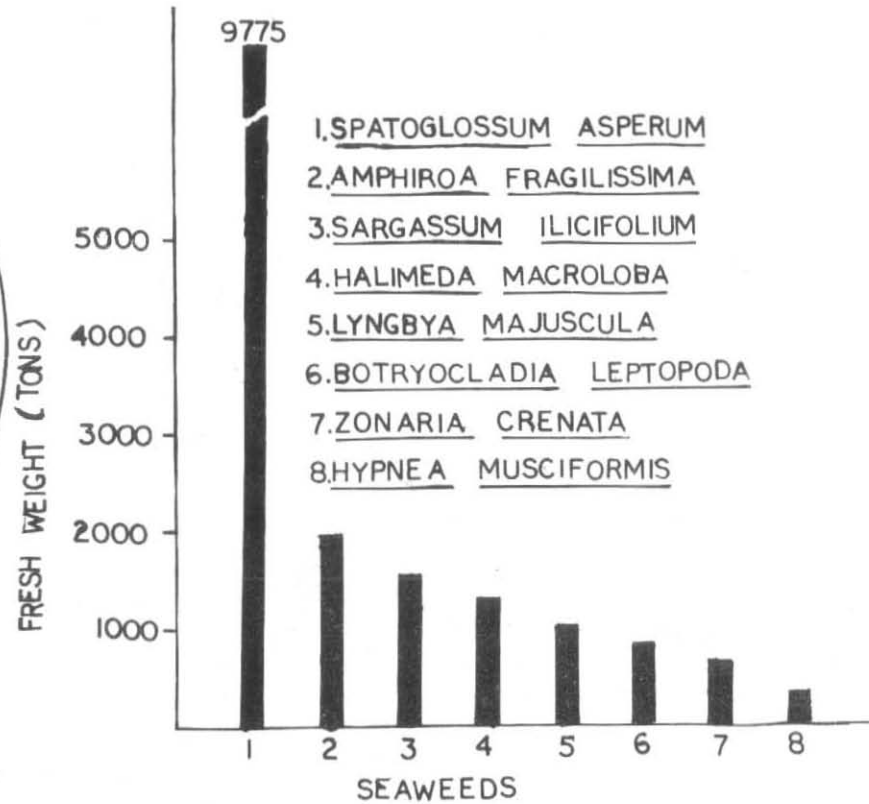


Fig. 2. Percentage composition of green, brown, red and blue green algae.



computed to get the total standing crop for the whole area surveyed. The specieswise resource estimates and the total area covered were also computed by the same method. Quantitative assessment for the species was made only when the sample weight was 5 g (wet) or more in 1 sq.m. For the others occurring in traces [less than 5 g], species composition alone was recorded.

Results

The transects and stations along each transect from Kilakkarai to Rameswaram Island (Dhanushkodi) are given in Fig-1. The vegetation consisted of 29 species of algae, Chlorophyta 8, Phaeophyta 8, Rhodophyta 12 and Cyanophyta 1 and one species of seagrass. The percentage composition of green, brown and red algae is given in Figure 2. The transectwise standing crop of 20 species is given in Table.1. The quantity of seaweeds over 417.5 sq.km. area surveyed was found to be 18,162.5 tons (wet). Of the 20 species, the estimates for the more abundant species, viz. *Halimeda macroloba*, *Spatoglossum asperum*, *Zonaria crenata*, *Sargassum ilicifolium*, *Amphiroa fragilissima*, *Hypnea musciformis*, *Botryocladia leptopoda* and *Lyngbya majuscula* were : 1325, 9775, 650, 1550, 1925, 300, 862.5 and 1012.5 tons (wet) respectively (Fig. 3). Out of 167 stations surveyed in 13 transects, only 12 stations supported vegetation in a productive area of 30 sq.km.

Discussion

In the earlier studies Varma & Krishna Rao (1952) and Umamaheswara Rao (1969, 1972 a, 1972 b; 1973) had only indicated quantity of certain selected seaweeds. Krishnamurthy (1971) stressed the need for scientific exploration of new beds of economic seaweeds. Subbaramaiah (1977) suggested conservation methods for *Gelidiella acerosa* in the Mandapam region. Krishnamurthy (1967), Subrahmanyam (1967) and Desai (1967) while dealing with the seaweed resources around Gulf of Mannar region pointed out the need for more detailed survey of deeper waters in this region. Kaliaperumal *et al* (1987) emphasized the need for intensive survey of deepwater for a long period not only in this region but in other area of the India coasts as well and that would throw light on resources availability in the natural habitat and mitigate the paucity of raw material for the seaweed industry. The earlier surveys reflected only the quantity of particular economically important seaweeds whereas the present survey was both extensive and intensive. This survey however revealed less number of species in deeper water as compared to those in the corresponding intertidal and shallow water region (Anon, 1978). Seventy four algal species were encountered in the intertidal and shallow water survey between Mandapam and

Kilakkarai whereas only 29 species were recorded from deeper waters. It is also evident that 15 algal species belonging to 11 genera recorded in the present survey were found in the intertidal and shallow water region. They are : *Halimeda*, *Caulerpa*, *Neomeris*, *Sargassum*, *Dictyota*, *Zonaria*, *Hormophysa*, *Amphiroa*, *Hypnea* *Chondrococcus* and *Lyngbya*. The density of seaweeds in the present sector (43.502 tons / sq.km.) was also found to be less when compared with that (231.459 tons / sq.km.) in shallow waters of this region upto 5 m depth.

Acknowledgement

The authors express their sincere thanks to Prof.M.M.Taqi Khan, Director, Central Salt & Marine Chemicals Research Institute, Bhavnagar and Dr.P.S.B.R. James, Director, Central Marine Fisheries Research Institute, Cochin for their interest and encouragement.

Literature cited

- Anon, 1978 A report on survey of marine algal resources of Tamil Nadu, 1971-76, CSMCRI, Bhavnagar 1-137
- Chennubhotla, V.S.K., N.Kaliaperumal., S.Kalimuthu., J.R.Ramalingam., K.Subbaramaiah., K.Rama Rao & P.V.Subba Rao 1990 Seaweed resources of the Tuticorin - Tiruchendur coast, Tamil Nadu,India, Jour. Mar. Biol. Ass. India 32 (1 & 2): 146-149
- Desai, B.N. 1967 Seaweed resources and extraction of alginate and agar. Proc. Seminar on Sea Salt & Plants CSMCRI Bhavnagar 343-351
- Kalianerumal, V., V.S.K.Chennubhotla., & S.Kalimuthu, 1987 Seaweed resources of India CMFRI Bull. 41: 51 - 54
- Krishnamurthy, V., R.Venugopal., J.G.Thiagaraj & Shah, 1967 Estimating drift seaweeds on the Indian coasts. Proc. Seminar on Sea Salt & Plant CSMCRI Bhavnagar 1-36
- Subbaramaiah, K. 1977 Conservation of *Gelidiella acerosa* natural resources. Seaweed Res. Utiln. 2: 62-64

- Subrahmanyam, R. 1967 Methods of assessing seaweed resources and problems Proc. Seminar Sea Salt & Plant CSMCRI Bhavnagar 311-314
- Umamaheswara Rao, M. 1969 Agar and algin yielding seaweeds of India Proc. 6th Intl., Seaweed Symp. 715-721
- Umamaheswara Rao, M. 1972 a Coral reef flora of Gulf of Mannar and Palk Bay Proc. Symp. Corals and Coral Reefs 217-230
- Umamaheswara Rao, M. 1972 b. On the *Gracilariaceae* of the seas around India Jour. Mar. Biol. Ass. India 14: 671-696
- Umamaheswara Rao, M. 1973 The seaweed potential of the seas around India. Proc. Symp. on living Resources of the Seas around India 687-692
- Varma, R.P. & Krishna Rao, K., 1962 Algal resources of Pamban area. Indian J. Fish. 9: 205-211