# DISTRIBUTION OF MARINE ALGAE AND SEAGRASS OFF VALINOKKAM-KILAKKARAI, TAMIL NADU COAST

**N.Kaliperumal, S.Kalimuthu, K.Muniyandi, J.R.Ramalingam, S.Krishnapillai, V.S.K.Chennubhotla* and M.S.Rajagopalan****
Regional Centre Central Marine Fisheries Research Institute
Marine Fisheries - 623520, Tamil Nadu

and

**P.V.Subba Rao, K.Rama Rao, P.C.Thomas, S.H.Zaidi and K.Subbaramaiah**
CSMCRI - Marine algal Research Station, Mandapam - 623518
Tamil Nadu.

## Abstract

The deep water area between Valinokkam and Kilakkarai in Tamil Nady coast covering an area of 200 sq.km. was surveyed for the distribution of marine algae and seagrasses during January 1989. Totally 33 species of marine algae were recorded of which 8 species belonged to Chlorophyta, 8 to Phaeophyta and 17 to Rhodophyta. Only one species of seagrass *Halophila ovalis* occurred in the whole area surveyed. The vertical distribution of seaweeds and their abundance were investigated. Hydrological data collected from the area syurveyed are presented.

* Research Centre for CMFRI, Visakhapatnam - 530 003, Andhra Pradesh
** Central Marine Fisheries Reserach Institute, Cochin - 682 014, Kerala

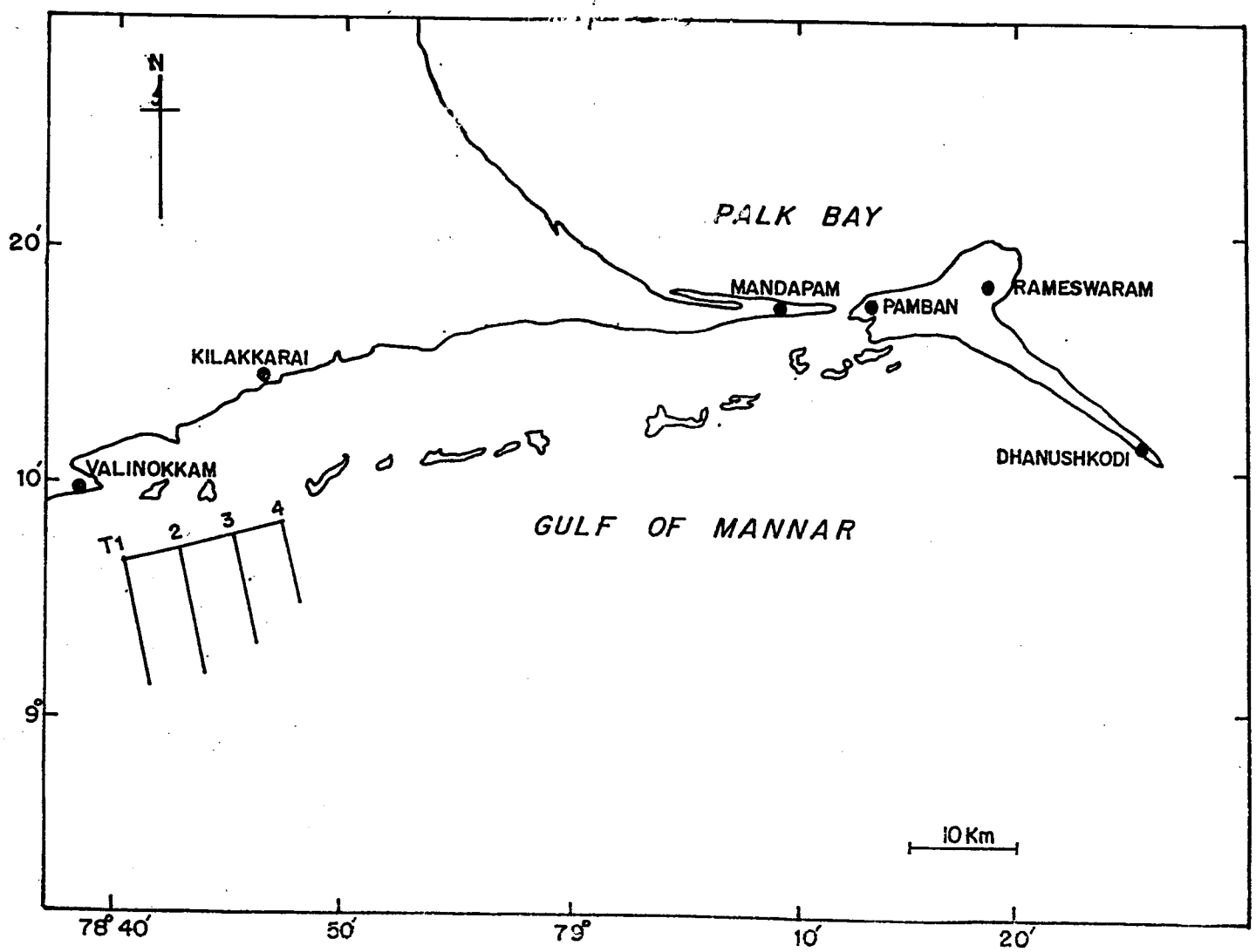


Fig.1 Map showing the location of transsects in the area surveyed from Valinokkam to Kilakkarai.

## Introduction

Very few attempts were made to assess the availability of seaweed growing in deep water (Varma, 1960; Mahadevan and Nagappan Nayar, 1967). The Central Marine Fisheries Reseach Institute Central Salt & Marine Chemicals Research Institute jointly carried out the deep water seaweed resources survey from Dhanuskodi to Kanyakumari in Tamil Nadu coast during 1986-1991 in order to understand the distribution and the standing crop of seaweeds occuring at the depths ranging from 5 to 22 m (Anon, 1988, 1989, 1993a and 1993b). The distribution of seaweeds adn seagrasses in deep water between Valinokkam and Kilakkarai recorded during this survey is presented in this communication.

## Materials and Methods

The area from Valinokkam to Kilakkarai (latitude 8°58-9°8'N and longitude 78° 40'-78° 849' E) was surveyed during January 1989. The total area of 200 sq.km was covered in four transects each at 5 km intervals (fig.1). The seaweed and seagrass samples were collected from one square metre area employing 'SCUBA' divers. The sampling stations fixed at every 500m distance along the transects. The seaweed and seagrass samples were sorted out and identified species wise. The water samples were collected from the bottom between 07.00 and 10.45 hrs at the firs, middle and last stations of each transect and they were analyses for pH, salinity, dissolved oxygen and nutrients following the methods given by Strickland and Parsons (1986). The atmospheric and bottom seawater tempertaure were also recorded at the stations from where water samples were collected.

## Results and Discussion

The contour map showing the number and depths of sampling stations and also the stations with vegetation along the tranmsacts is given in Fig.2. The number of stations sampled along the four transacts varied from 15 to 22. The depths of sampling stations ranged from 7.5 to 21m. The substrution at the sampling stations consisted of sand, mud, rock, pebbles and sand-mud mixture. The vegetation generally occurred on rock and pebbles.

The vegetation was present only in 11 stations out of 80 sampling stations surveyed in 4 transects. The vertical distribution of the species along the transect varied from four sampling stations in Transect No.1, six sampling stations in Transect No.2 and one sampling stations in Transect No.3. There was no vegetation in Transect No.4 (fig.2). The vegetation consisted of 33 species of algae of which 8 species belonged to Chlorophyta, 8 species to Phaeophyta and 17 species to Rhodophyta. Only one species of seagrass, *Halophila ovalis* was found growing at the depths of 9.5 and 12 m. The list of all these species and the transect and stations in which they occurred are give Table.1. The dominant and widely distributed algae were *Halimeda macroloba,*

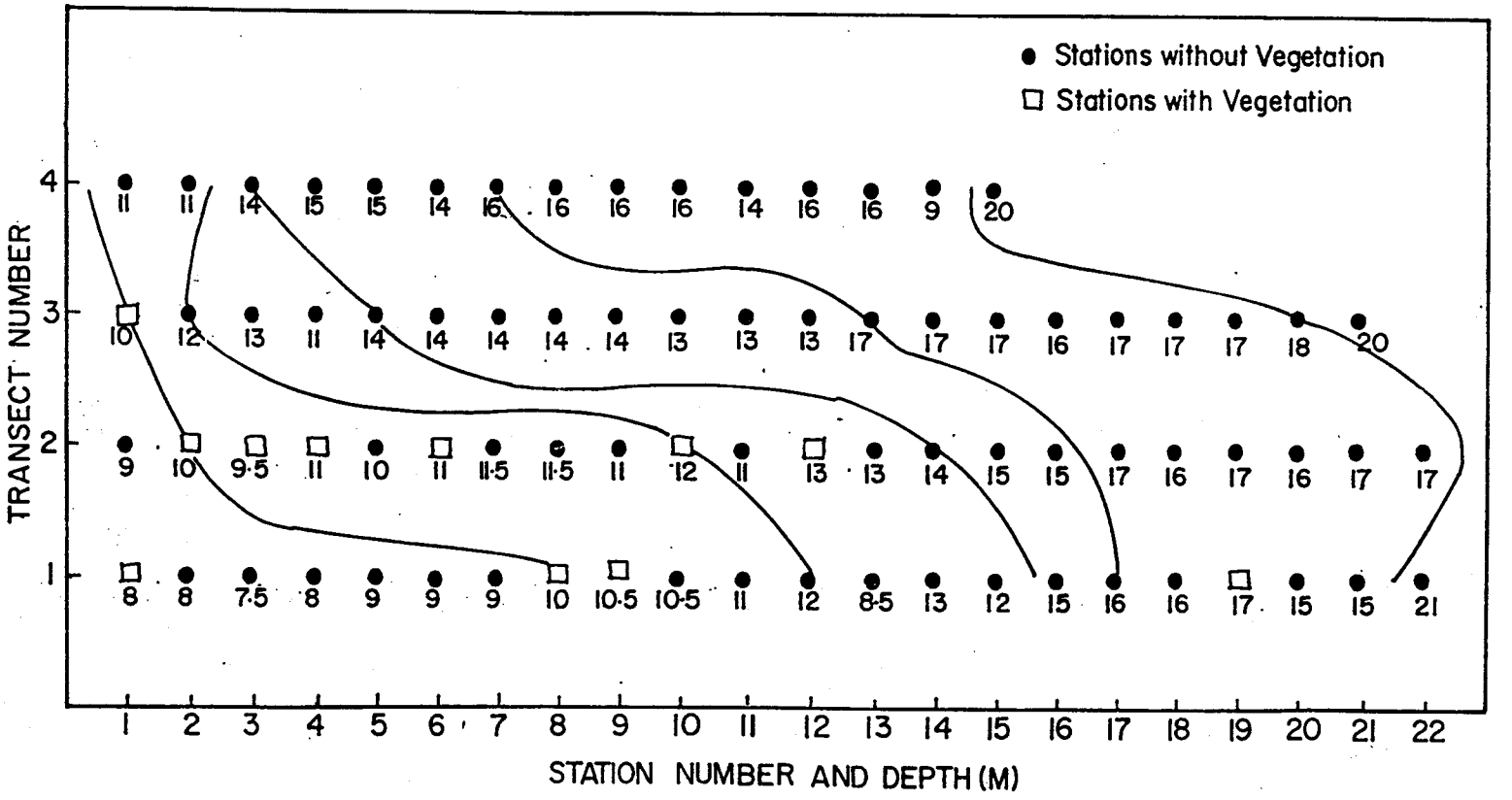


Fig.2 Contour map showing the depths of stations along the transects and stations with vegatation.

*Helminthocladia australis, Halymenia floresia, Solieria robusta and Hypnea flagelliformis:*

Data collected on hydrological parameters from some of the sampling stations are given in Table 2. The atmospheric temperature varied from 25.2 to 29.6°C and bottom seawater temperature from 25.3 to 28.2°C. The pH of seaweter was 8.2 . The salinity varied from 27.90 to 33.72 % and dissolved oxygen from 3.48 to 4.23 ml/l. the phosphate content ranged from 0.05 to 0.13, silicate from 3.0 to 14.5, nitrite from 0.01 to 0.23 anmd nitrate from 0.75 to 3.25µg at/l.

The seaweeds were present only on pebbles and rocky substrata. Out of 33 algae recorded, 10 species were fouund growing between 8 and 10 m depth, 16 speices at 10 m and below and remaining 7 speices at various depths rangiang from 8 to 17 m. It is evident tha the deep water algal flora is entriely different from the intertidal and shallow water flora of this region except for a few common speices such as *Dictyota dichotoma, Sargassumn ilicifolium, Amphiroa fragilissima* and Hypena musciformis (Anon, 1978). The quantitiative analysis of the economically important seaweeds encountered during this survey revealed the feasibility of commercial exploitation and utilisation of *Hypena* sp. (412.5 tons of *H.flagelliformis*, 225 tonns of *H. valentiae* and 75 tons of *H. musiciformis*) for the production of kappa carrgeenan by the seqweed industries.

**Acknowledgement**

The authors are grateful to Dr.P.S.B.R. James, Director, Central Marine Fishereis Research Institute, Cochin, Prof.M.M.Taqui Khan, Director, General Salt & Marine Chemicals Research Insititute, Bhavnagar,. Dr.P.Vedauvyasa Rao, Office -in-charge, Regional Centre of CMFRI, Madapam-Camp and Dr. K.A.Narasimham, Officer-in-charge, Research Centre of CMFRI,. Tuticorin for their encouragement and facilities provided for carrying out this srurvey.

**Table 1** List of algae and seagreasses recorded and their occurrence along the transects from Valinokkam to Kilakkarai

| Sl. No. | Name of the species | occurrence between 8 and 10 m depth | Occurence between 8 and 10 m above depth | Occurrence between 8 and 17 m depth | Transect number and station number |
|---|---|---|---|---|---|
| **Chlorophyta** | | | | | |
| 1. | *Enteromopha* | | | | T2 S2 |
| 2. | *intestinalis* | + | | | T2 S2 |
| 3. | *Ulvalactuca* | + | | | T1 S19, T2 S6 |
| 4. | *Chaetomorpha* | | + | | T2 S6 |
| 5. | *Cladophora Caulapaonor* | + | + | | T3 S1 |
| 6. | *Sertulasiodes* | | + | | T2 S4 |
| 7. | *Halimeda macroloba* | | + | | T1 S8, S9, T2S10, T3S1 |
| 8. | *Anadyomene stellata* | + | | | T3 S1 |
| **Phaeophyta** | | | | | |
| 9. | *Bartayresiana* | | + | | T2 S2, S12 |
| 10. | *Dictyota* | + | | | T3 S1 |
| 11. | *D.dichotoma* | | + | | T2 S3, S4, S12 |
| 12. | *D.maxima* | | + | | T1 S9, T2 S2, T3 S1 |
| 13. | *Pajdna pavonica* | | | + | T1 S1, S8, S9 |
| 14. | *Spatoglossum asperum* | | + | | T2 S2, S4 |
| 15. | *Colpomenia sinuosa* | | + | | T1 S8, S9 |
| 16. | *Hormophysa triquetra* | | + | | T2 S10; |

| | | | | | |
|---|---|---|---|---|---|
| **Rhodophyta** | | | | | |
| 17. | *Helminthocladia* | | | + | T2 S2, S3, S4, S6 |
| 18. | *Scinaia bengalica* | + | | | T3 S1, |
| 19. | *Amphiroa fragilissima* | | | + | T1 S1, S19, T2 S2, S6, S10. |
| 20. | *Halymenia floresia* | + | | | T3 S1 |
| 21. | *H.Venusta* | | + | | T3 S1 |
| 22. | *Gracilaria textorili* | | | + | T2 S2, S6 |
| 23. | *G.Verrucosa* | | + | | T2 S12, T3 S1 |
| 24. | *Sarcodia indica* | | + | | T2 S10 |
| 25. | *Sarconema filiforme* | | | + | T1 S1, S19, T2 S2, S3 |
| 26. | *S.furcellatum* | | | + | T2 S3, S4, S6,S10 |
| 27. | *Solieria robusta* | + | | | T1 S1, T2 S2 |
| 28. | *Hypenea flagelliformis* | | + | | T2 S10, T3 S1 |
| 29. | *H.muscifomis* | | + | | T2 S10, T3 S1 |
| 30. | *H.valentiae* | + | | | T3 S1 |
| 31. | *Haloplegma duperrevi* | | + | | T1 S19, T2 S12, T3 S1 |
| 32. | *Laurencia ceyvalanica* | + | | | T3 S1 |
| 33. | *Dictyurus* | + | | | T3 S1 |
| **Seagrasses** | | | | | |
| 34. | *Halophila oyalis* | + | | | T2 S3, S4 |

Table 2 **Hydrologicval data collected during the deep water seaweed fresources survey from Valinokkam to Kilakkarai**

| Date of collection | Transect & Sector number | Depth (m) | Temperture (°C) | | | pH | Salinity (%.) | Oxygen (ml/l) | Nutrients | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Time of collection (hrs) | A.T. | S.W.T | | | | Phosphate (µg/at/l) | Silicate (µg at/l) | Nitrate (µg at/l) |
| 24.1.89 | T1 S1 | 8.0 | 08.15 | 27.8 | 27.2 | 8.2 | 27.90 | 3.57 | 0.13 | 12.0 | 0.03 |
| 24.1.89 | T1 S10 | 10.5 | 09.30 | 27.8 | 27.8 | 8.2 | 32.90 | 3.67 | 0.08 | 12.0 | 0.01 |
| 24.1.89 | T1 S22 | 21.0 | 10.45 | 28.0 | 28.0 | 8.2 | 32.07 | 3.48 | 0.05 | 12.0 | 0.01 |
| 25.1.89 | T2 S1 | 9.0 | 08.30 | 26.0 | 27.0 | 8.2 | 32.28 | 3.57 | 0.08 | 12.0 | 0.01 |
| 25.1.89 | T2 S10 | 12.0 | 09.45 | 27.0 | 27.8 | 8.2 | 32.24 | 4.23 | 0.08 | 11.5 | 0.01 |
| 25.1.89 | T2 S22 | 17.0 | 10.15 | 29.6 | 28.2 | 8.2 | 33.54 | 3.48 | 0.13 | 12.5 | 0.01 |
| 29.1.89 | T3 S1 | 10.0 | 08.45 | 26.2 | 27.2 | 8.2 | 33.28 | 3.76 | 0.13 | 12.5 | 0.01 |
| 29.1.89 | T3 S20 | 13.0 | 09.45 | 27.5 | 26.8 | 8.2 | 33.72 | 3.67 | 0.10 | 12.5 | 0.01 |
| 29.1.89 | T4 S1 | 18.0 | 10.15 | 26.4 | 27.8 | 8.2 | 33.02 | 3.95 | 0.05 | 14.5 | 0.08 |
| 31.1.89 | T4 S10 | 11.0 | 09.00 | 25.2 | 25.3 | 8.2 | 32.50 | 3.67 | 0.05 | 14.0 | 0.23 |
| 31.1.89 | T4 S10 | 16.0 | 09.30 | 25.8 | 26.4 | 8.2 | 32.90 | 3.57 | 0.08 | 3.0 | 0.03 |
| 31.1.89 | T4 S15 | 20.0 | 10.00 | 25.4 | 27.6 | 8.2 | 32.01 | 4.14 | 0.08 | 12.5 | 0.01 |

## Literature Cited


Anon, 1978 A report on survey on marine algal resources of Tamil Naduy 1971-1976 CSMCRI, Bhavangar pp.1-137.

Anon 1988 A report on the seaweed resources of Tamil Nadu cosast India II sector - Alantalai to Manapad and Vembar to Nallatanni Tivu. CSMCRI & CMFRI pp.1-30

Anon, 1989, A report on the seaweed resources of the Tuticorin-Tiruchendur coast, Tamil Nadu, India, CMFRI & CSMCRI pp.1-19.

Anon, 1993a A report on the seaweed resources of Tamil Nadu coast, India III Sector Valinokkam-Kilakkarai and Manapad-Kanyakuami 1989-1990 CMFRI & CSMCRI pp.1-23

Anon, 1993b A report on the seaweed resources of Tamil Nadu coast, India IV sector Kilakkarai-Rameswaram Island (Dhanushkodi) CSCMCRI & CMFRI pp.1-20.

Mahadevan S. and K.Nagappan Nayar 1967 Underwater ecological observations in the Gulf of Manner off Tuticorin *J. mar. biol. Ass. India* 9(1): 147-163.

Strickland, J.D.H. and T.R. Parsons 1968 A *practical handbook of seawater analysis Bulletin.* 167. Fisheries Research Board of Canda pp. 1-311.

Varma R.P. 1960 Flora of pearl beds off Tuticorin *J. mar. biol. Ass. India* 2(2) : 221-225.