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SURVEY OF MARINE ALGAL RESOURCES OF TAMILNADU

1971 - 1976

RP 00124

Organisations

CENTRAL SALT & MARINE CHEMICALS RESEARCH INSTITUTE

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

DEPARTMENT OF FISHERIES GOVT. OF TAMILNADU

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#### FOREWORD

This report brings out the marine algal resources of the Tamil Nadu coast as the outcome of the Marine Algal Survey undertaken during 1971-76 as a co-ordinated project by the three organisations : Department of Fisheries, Government of Tamil Nadu, The Central Marine Fisheries Research Institute and the Central Salt & Marine Chemicals Research Institute. The survey was conducted both intensively covering all the marine algal species and extensively covering a wide coastline in the intertidal and sub-tidal beds. Though found in moderate quantities in comparison with the rich seaweed beds in the world, the marine algal resources estimated now are found to be quite considerable. Inspite of the fact that some of the economic seaweeds have been commercially exploited from this region, there is still a possibility for greater harvesting and utilization of the brown algae particularly the species of Sargassum and Turbinaria for alginate industry and the species of Gracilaria for agar industry in our country. However, resources of Gelidiella acerosa need to be conserved. The scope for harnessing other available marine algal resources and their proper utilization, say for extractives, fertilizer, etc. are indicated. The concerted effort of the collaborating organizations in this venture is greatly appreciated.

(Dr. D.J. Mehta)

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Director
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BHAVNAGAR - 364 002.

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#### PROJECT PERSONNEL

1. Central Salt & Marine Chemicals Research Institute

#### Planning and Organization

Director : Dr.D.J.Mehta

Participants	Designation	Sectors attended
		چي ويون مين مين مين مين مين مين مين مين مين مي
Dr.K.Subbaramaiah	Scientist-in-Charge, CSMCRI Marine Algal Research Station,	I, II, III & V.
	Mandapam.	
Dr.V.Krishnamurthy	Scientist-in-Charge (1971-72), CSMCRI	I and the second
	Marine Algal Research Station, Mandapam	
Dr.K.Rama Rao	Scientist	II, III, IV & V.
Shri M.R.P. Nair	Scientist	I, II, III, IV & V.
Shri P.C.Thomas	S.S.A.	III
Shri P.V.Subba Rao	J.S.A.	· <b>V</b>
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Shri S.M.N.Jainulabde	en Plant Collector	I, II, III, IV & V.
Shri A. Sathaku	Plant Collector	III, IV & V.
Shri M. Nandagopal	Field Assistant	I, II, III, IV & V.
Shri M.Antony Rayappan	Field Assistant	1/1& ,II.
Shri A.M.Abdul Majeed	Field Assistant	I & II.
Shri M.Michael Dass	Field Assistant	III.
		Six persons on Field Duty.

#### DATA PROCESSING AND REPORTS

Dr. K.Subbaramaiah, Scientist-in-Charge

Dr. K. Rama Rao, Scientist

Shri M.R.P. Nair, Scientist.

## 2. Central Marine Fisheries Research Institute

Directors: Dr. E.G. Silas
Dr. R. V.Nair

Dr. S.Z. Qasim

Participants · I	Designation	Sectors attended
Shri V.S.Krishnamurthy Chennubhotla	Scientist S-2	IV & V.
Dr.M.Umamaheswara Rao	Asstt.Fisheries Scientist	I & II.
Dr.P.S.Kuriakose	Scientist-S	I, II & III.
Shri Shivalingam	Scientist-S	III.
Shri Kaliaperumal	Scientist-S	I(in part), II, III, IV & V.
Shri Kalimuthu	Tech.Asstt. (II-3)	I, III, IV & V.
Shri J.R. Ramalingam	Tech.Asstt. (T-II)	
Shri N. Selvaraj	Tech. Asstt. (T-II)	IV
Shri Narayanasamy	Tech.Asstt. (T-II)	
Shri Dhanraj	Tech. Asstt. (T-II)	
Shri Mohideen	Supporting Staff(I	I) I, II, III, IV & V.

Three persons on Field Duty.

#### DATA PROCESSING

#### STATISTICAL ANALYSIS OF THE I-SECTOR

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Shri K.S.Ramakrishnan, I.A.S.
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Shri A.D.Isaac Rajendran
Shri B. Krishnamurthy

Deputy Directors

Shri K.M.Md.Sultan
Shri S.L.Vaidyanathan
Shri M.Kalimuthu
Shri P.P. Krishnasamy
Shri S.X. Arokiasamy

Participants	Designation	Sectors attended
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Shri Kaliaperumal	Research Assistant	I (in part)
Shri A.Dasman Fernando Shri Chusan	Driver Driver	I & II.
Shri Anthony Pitchai	Driver	II.
Shri Dhanavelu	Sub.Asstt.Inspector of Fisheries	I, II, III & IV.
Shri S.Latif	Sub.Asstt.Inspector of Fisheries	V.
Boat crew		

Four persons excluding the boat crew.on field work in I & II Sectors.

Two persons excluding the boat crew on field work in III & IV Sectors.

Two persons only on field work in V Sector:

#### INTRODUCTION

#### istorical :

Earlier work on the Marine Algal Resources of india has been extensively reviewed (Thivy, 1960; Desikachary, 1967; Umamaheswara Rao, 1970; Krishnamurthy, 971). Estimates of the seaweeds were given for some regions of the Madras and Kerala coasts by Koshy and John (1948), Chacko and Malupillai (1958), Thivy (1951, 1960), Desai (1967), Varma and Krishna Rao (1962) and Umamaheswara Rao (1968). Of these the assessment of the resources were nade systematically and accounts of the methods followed were given by the latter two groups of workers. Varma and Krishna Rao (1962) gave an estimate of 19 tons wet Gelidiella, about 335 tons wet Gracilaria and 660 tons wet 5argassum in 234.25 sq.km. area between Dhanushkodi and Hare Island in the Gulf of Mannar. The standing crop of different seaweeds and sea grasses was estimated covering the coral reef and lagoon areas in Palk Bay side of the coastline, near Mandapam over an area of 3.58 sq.km.by Umamaheswara Rao (1968). The total quantities varied from 1041.69 tons wet in 1965 to 864.77 tons wet in 1976. The fall in the standing crop in the latter year was attributed to the collections of Gracilaria lichenoides made from this area during the year.

Recent estimates of the seaweeds based on the landings are also of much value. Umamaheswara Rao(1968) gave harvest figures yearwise for Pamban, Periyapattanam and Kilakkarai during 1966-63; 15.19 tons for Pamban in 1966 and 141.97 and 329.24 tons for all the three places during 1967 and 1968 respectively. The harvest figures for the various seaweeds gathered near Periyapattanam for the year 1967 were given as: Gelidiella acerosa 51.05 tons, Gracilaria lichenoides 15.50 tons and Sargassum spp. 5.0 tons, totalling 71.55 tons for all these seaweeds. Subbaramaiah et al. (1975) put the harvested estimates of Gelidiella acerosa at 150 tons.

A study of the seaweed drift in the Indian coast was carried out by a team of workers from the CSMCRI.

Krishnamurthy et al. (1967) and Krishnamurthy (1967) gave

the estimated figures for Idinthakarai and Pamban (15 km coast) as 78 tons (54.262 tons of Sargassum, 2.825 tons of other alginate seaweeds, 4.075 tons of Gracilaria, 1.637 tons of Hypnea and 1.7 tons of other agarophytes and 11.33 tons of other seaweeds).

Prior to the establishment of the indigenous seaweed based industries some of the economic seaweeds particularly <u>Gelidiella acerosa</u> were mainly exported to the far East and the U.S.A. In 1967 alone 198.04 tons were exported, although during the three years 1966-68 the export in all amounted to 452.88 tons (value Rs 13, 71,951).

#### CHARACTER OF THE STUDY

The present survey of the marine algal resources of Tamil Nadu was undertaken as a co-ordinated project jointly by the Central Salt & Marine Chemicals Research Institute, the Central Marine Fisheries Research Institute and the Department of Fisheries, Government of Tamil Nadu. This formed part of the principal area of investigations of the Central Salt & Marine Chemicals Research Institute approved by the National Committee on Science & Technology. The technical details and methodology used in the survey were worked out by Dr.K.Subbaramaiah, Dr.V.Krishnamurthy of the Central Salt & Marine Chemicals Research Institute and Dr.M.Umamaheswara Rao of the Central Marine Fisheries Research Institute.

The main aim of the survey is to determine the standing crop of the seaweed resources of the region and their distribution. The survey also included the collection of basic supplementary data on seagrasses, plamkton, bottom fauna, and hydrology. The data collection on the sea shore was carried out by all the three organisations jointly. The other aspects of work were shared as follows:

#### 1. CSMCRI

- (i) General planning and organisation of the field work and study,
- (ii) Mapping of the shore surveyed including the profiles,
- (iii) Systematic identification of the species of marine algae and their distribution,
- (iv) Estimation of the standing crop of the seaweeds (except the I Sector), and
  - (v) Preparation of the reports.

#### 2. CMFRI

- (i) Estimation of the standing crop of the I-Sector,
- (ii) Plankton and bottom fauna analysis,

## 3. Department of Fisheries, Tamil Nadu

- (i) Part of hydrology (nutrients),
- (ii) Chemical analysis of bottom sediments,
- (iii) A 32-footer launch, and two divers to collect samples in the I and II sectors. The divers for the remaining three sectors and most of the survey equipments were provided by the CSMCRI.

This report deals only with the seaweed resources and is divided into two parts: I - An evaluation of the seaweed resources including the methods of survey, and II - Details of the estimates, coastline, profiles, distribution of seaweeds, the substrata cover and density of the samples, and practical considerations.

#### PART - I

### METHODS

A sampling method for the survey of the Marine Algae both in the intertidal and sub-tidal regions was devised taking into consideration the heterogenous distribution of the marine algal vegetation growing attached to a discontinuous and patchy substratum. The coastline between Mandapam and Colachel was covered in five years, during the favourabl season in a year, each being referred to as a sector. The area within a sector was divided into sampling stations at intervals of 3 km. At each sampling station three transects were established one at the centre and one each on either side at a distance of 100 m. Along the three transects which lie perpendicular to the shoreline depthwise samples at intertidal, 0, 0.5, 1.0, 1.5, 2.0 and 4.0 m depths were taken by the divers (skin diving only). A plumbline was used to fix the depths. A party moved from the shore into the sea along the transect previously aligned by erecting two poles on the shore until a particular depth was reached for fixing a sampling point. A canoe or Catamaram was employed for

working at greater depths. At the same time the vertical distances of the sampling points from the base-line were recorded with the help of sextent. These data were used in preparing a profile of the sea bottom at each sampling station and for the area calculation of each depth zone. In addition, the shore partly made a compass coastline survey along the shore marking the sampling stations from which a shore map of the sector was prepared. At all sampling points the nature of the substratum and the percentage cover of different seaweeds and seagrasses found in the 1.0 m metal quadrat were noted and all the seaweeds therein were collected. Each quadrat sample was sorted out into the different species of seaweeds and fresh weights of these were recorded seperately. And the different seaweeds and the sea grasses were preserved in herbarium, and in 5% formalin. Seaweed species weighing 5 g wet and above were considered for estimation, while the others (i.e. weighing less than 5 g wet) were indicated as rare.

Sectorwise, the sampling data was subjected to statistical analysis in order to give specieswise resource estimates with errors. The area, density and standard error of the samples at the various depth zones were calculated seperately, and the standing crop estimated. The estimates of all the zones were added to get the total estimates of the standing crop (wet) of a sector.

## EVALUATION OF SEAWEED RESOURCES

During the five years from 1971-76 survey of the marine algal resources was done covering the coast from Athankarai to Rameswaram in the Palk Bay 45 km and from Thonithurai (Mandapam) to Melmidalam(Colachel) mainland, and the adjoining islands in the Gulf of Mannar (413 km) in five sectors. The area surveyed within the various sectors are located in Ramanathapuram, Tirunelveli and Kanyakumari Districts as follows:

I Sector - the mainland coast from Rameswaram to Athankarai in the Palk Bay between 9° 17' - 9° 20' N, 79° 19' - 79° 0'E); the mainland coast from Thonithurai (Mandapam) to Kilakkarai and the offshore islands, viz. Shingle, Krusadai, Pullivasal, Pulli, New, Manoli, Hare, Valai and Appa islands in the Gulf of Mannar (between 9° 16' - 9° 8' N and 79° 14' - 78° 47' E);

II Sector - the mainland coast from Kilakkarai to Mukkaiyur and the adjoining offshore islands, viz. Upputhanni, Suli, Nallathanni, Yanaiparai, Palliamuni and Nandamukhi islands (between  $9^{\circ}$  13' -  $9^{\circ}$  06' N and  $78^{\circ}$  47' -  $78^{\circ}$  28' E);

III Sector - the mainland coast from Mukkaiyur to Punnakkayal (Tuticorin) and the adjoining offshore islands, viz.Karaya, Challi and Van islands (between 90 06' - 80 38' N and 78° 28' - 78° 08' E);

IV Sector - the coast from Punnakkayal (Tuticorin) to Cape Comorin (Kanyakumari) between 80 381 - 80 05! N and  $78^{\circ} 08! - 77^{\circ} 32! E)$ ; and

V Sector - the coast from Cape Comorin (Kanyakumari) to Melmidalam (Colachel) between 8° 05' - 8° 11' N and 77° 32' - 77° 09' E).

In the I Sector the survey was done twice at different times in the year as follows: In the Gulf of Mannar I Survey 20th April, 1971 to 11th November 1971, II Survey 17th November, 1971 to 6th May, 1972 and in the Palk Bay I Survey 18th May 1971 to 18th June 1971, II Survey 18th August 1971 to 8th September 1971, whereas in sectors II to V, the survey was done only once during the season as follows: II sector December 1972 to February 1973, III sector October 1973 to February 1974, IV sector November 1974 to January 1975 and V sector November to December, 1975. The survey generally extended from the intertidal region on the shore to a depth of 4.0 m in the sub-tidal region beyond which the vegetation was very sparse. The estimates of the standing crop for the individual seaweeds were grouped together under the heads agarophytes, alginophytes and others. In the I sector the seaweed estimates were so arrived as to include the higher values from out of the two surveys made.

RESOURCES The tonnage of the standing crop (wet) for the whole coastal area of 17,125 ha is 22,044 tons, consisting 1,709 tons agarophytes, 10,266 tons alginophytes and 10,069 tons others. The groupwise standing crop for the various sectors consisted of : I sector - agarophytes 1,180 tons, alginophytes 8,998 tons, others 7,143 tons, total 17,322 tons; II sector agarophytes 184 tons, alginophytes 168 tons, others 160 tons, total 512 tons; III sector - agarophytes 176 tons, alginophytes 10 tons, others 437 tons, total 623 tons; IV sector -agarophytes 145 tons, alginophytes 24 tons, others 2,273 tons, total 3,438 tons; V sector - agarophytes 24 tons, alginophytes 69 tons, others 56 tons, total 149 tons. The percentage of the

total estimated standing crop of these groups in each sector can be compared: I sector agarophytes 69.07, alginophytes 87.65, others 70.94; II sector - agarophytes 10.75, alginophytes 1.63, others 1.60; III sector - agarophytes 10.28, alginophytes 0.10, others 4.34, IV sector - agarophytes 8.46, alginophytes 9.94, others 22.57, V Sector - agarophytes 1.43, alginophytes 0.67, others 0.55. The mean density (mean biomass wet as kg/m²) of the seaweeds is found to be 0.129 for the whole area and for I - V sectors 0.206, 0.028, 0.014, 0.198, 0.025 respectively. These values represent mean productivity of the standing crop which is maximum in the I sector and decreases in the order IV, II, III and V sectors.

The estimated standing crop in tons (wet) of the important economic seaweeds and their distribution are given below:

#### \qarophytes

1. <u>Gelidiella acerosa</u>	74; I-70, II-4 and absent in III, IV & V sectors.
2. Gracilaria edulis	345; I-322, II-3, III-20 and absent in IV & V sectors.
G. corticata, G. compressa,	)
<ul><li>G. crassa,</li><li>G. debilis,</li></ul>	629; I-471, II-6, III-2, IV-126 and V-24.
<ul><li>G. fergusonii,</li><li>G. foliifera, &amp;</li><li>G. spp.</li></ul>	
• Gracilaria spp. (Total of 2 & 3)	974; I-793, II-9, III-2, IV-126, V-24.
• Hypnea musciformis	293; I-Nil, II-166, III-115, IV-12 and V-NiI
<ul> <li>Hypnea pannosa</li> <li>H. spicifera</li> <li>H. spinella</li> <li>H. valentiae</li> <li>H. spp.</li> </ul>	) 505; I-458, II-5, III-39, IV-3 and V-0.2.
7. Hypnea spp. (total of 5 & 6)	798; I-458, II-171, III-154, IV-15, and V-0.2.
Alginophytes	
1. Sargassum spp.	9381; I-8145, II-140, III-7, IV-1020 and V-69.
2. Turbinaria spp.	714; I-689, II-25, III-Nil, IV-Nil and V-Nil.
3. Cystoseira trinodes	3.5; I-Nil, II-0.5, III-3, IV and V-Nil.

#### CONCLUSION

Thus, the present survey reveals that the available and accessible marine algal resources of Tamil Nadu are large (22044 tons) and varied in species composition. Assuming that the vast majority of the seaweeds in the region show the growth of their fronds to maturity within a year, the marine algal resources could perhaps generally be harvested upto 90 per cent of their total biomass each year. This coastal region of Tamil Nadu being highly resourceful has also been exploited by the collectors for the more economic seaweeds. With few exceptions as Gelidiella acerosa further scope for full exploitation and utilisation of the economic species is indicated. In addition, the availability (tonnage) and distribution (location) of the species of marine algae as yet unexplored and under explored from the region are the principal findings of the present survey.

## PART - II DETAILS OF THE ESTIMATES

## Estimated standing crop - I sector :

The estimated standing crop of 60 species occurring in the different depth zones in the two surveys is given in Table-1. These estimates for the individual species are arranged groupwise as agarophytes, alginophytes, and others, irrespective of their depth distribution (Table- 2). The groupwise estimates and their relative percentage are arrived by taking the maximum of the total quantities found in either of the two surveys (Table - 3).

The estimated standing crop in tons (wet) of the marine algae differs with season. In the better season the estimates for the more important economic seaweeds are found to be: Gelidiella acerosa 70 tons, Gracilaria edulis 322 tons, Gracilaria corticata 105, other species of Gracilaria 848 tons, Hypnea species 442 tons, Sargassum species 7353 tons, Turbinaria species 630 tons.

The total standing crop in the I sector in 8416
hectares is 17321 tons, comprising 1180 tons agarophytes,
8998 tons alginophytes, 7143 tons others. The most productive
region is between 0 and 1.25 m depths with a biomass of
about 237 kg/ha for the agarophytes and between 0 and 3.0 m
depths with a biomass 566 kg/ha for alginophytes. The average
density of the marine algae in the I sector is 2.06 tons/ha.

## Estimated standing crop - II, III, IV and V Sectors:

Sectorwise, the biomass sampling data for each species was analysed statistically to get the standing crop estimates with errors. A species may occur in several samples taken at certain depths and is designated as continuous. Besides, it may occur also in single samples at certain other depths and is designated as discrete. In cases where a species occurs both continuously and discretely at one or other depths, these estimates were added together to give the total estimates of a depth zone. The estimates of the various species from the different depth zones put together constitute the estimated standing crop of the marine algae in a sector as a whole. The estimated standing crop of the various species at different depths, and the specieswise estimates (biomass for all the depths) arranged as agarophytes, alginophytes and others, and the groupwise estimates and their relative percentage are given (Tables 4 - 26).

The estimated standing crop in tons (wet) of the more important economic seaweeds in the different sectors is found to be : II sector - Gelidiella acerosa 3.8 -- 4.8, Gracilaria species 8.2 -- 9.9, Hypnea musciformis 119.2 -- 211.2, other <u>Hypnea</u> species 4.8 -- 4.9, <u>Sargassum</u> species 106.7 -- 179.1, <u>Turbinaria</u> species 24.4 -- 25.2. The occurrence of Hypnea musciformis is restricted only to Nallathanni Island mostly at the 2.0 m depth zone. In all, species of Hypnea and Sargassum constitute the vast majority of the standing crop in the Second sector. III sector: Gracilaria species 17.6 -- 26.1, Hypnea musciformis 55.9 --173.0, other Hypnea species 23.0 -- 55.6, Sargassum wightii 7.3, Cystoseira trinodis 2.8. The occurrence of Hypnea musciformis and Cystoseira trinodes is restricted to the islands only, mostly at 2.0 m depth zone. Among the economic seaweeds, species of Hypnea and Gracilaria are abundant. These together with Caulerpa scalpelliformis, Champia parvula and Padina gymnospora form the vast majority of the standing crop in the Third sector. IV sector : Gracilaria species 86.229 -- 165.742, <u>Hypnea species 10.752 -- 18.783</u>, Sargassum species 297.510 -- 1743.330. Among the economic seaweeds Sargassum species are abundant. Among others although economically less important, species of Amphiroa Spatoglossum asperum, Enantiocladia prolifora and species of Laurencia form the vast majority of the standing crop in the Fourth sector. V Sector: Gracilaria spp. 19.904 -- 28.581, Sargassum spp. 67.835 -- 69.589. Among the economic seaweeds Sargassum species are abundant. Among others, although economically less important, <u>Valoniopsis</u> pachynema, species of Laurencia, Ulva fasciata, Amphiroa anceps form the vast majority of the standing crop in the Fifth sector. All sectors : Estimated standing crop of all the sectors along with the productive area in hectares and their relative percentages are given (Tables 27 - 28) to indicate an overall picture of the resources of agarophytes, alginophytes and the others. The estimated standing crop of the marine algae can be converted into their biomass dry weight by making deduction for the water loss on drying. The percentage of water loss of the more common Marine Algae was determined experimentally (Table - 29). The standing crop and the area surveyed in the different sectors are : I Sector -17322 tons, 8416 ha; II Sector - 512 tons, 723 ha;

III sector - 623 tons, 170 ha; IV sector - 3438 tons, 567 ha and V sector-149 tons, 16 ha; Total 22044 tons, 9892 ha. The break-up of the sectorwise seaweed quantities and the area surveyed expressed as a percentage of these for the over all estimates is: I sector - 78.58, 49.15; II sector - 2.32, 10.66; III sector - 2.82, 26.58; IV sector - 15.60, 10.11 and V sector - 0.68, 3.50 (Table 30).

#### COASTLINE

#### II Sector

The coastline extends to 56.6 km of which 45km are in the mainland and 11.6 km are in the islands and is divisible into 21 sampling stations (Sector II, Fig.1). Of these, 6 in the mainland, viz. 1, 2, 3, 5, 7 and 8 and all in the islands were productive, whereas the remaining ones were devoid of the vegetation. Sampling in 92 quadrats in the mainland and 98 in the island was done covering a maximum vertical distance of 2391 m and 1002 m into the sea respectively. The coast to the south of Valinokkam Bay is sandy with protruded sandstone/rock. And near Mukkaiyur, Mukkaiyur river joins the sea. All the six islands are situated 6 km off the mainland. One sampling station for each of the island was located on the northern side facing the mainland.

#### III Sector

The coastline extends to 122 km of which 114 km are in the mainland and 8 km are in the islands and is divisible into 41 sampling stations (Sector III, Fig. 1). Of these 7 in the mainland, viz. 1, 2, 19, 20, 23, 25 and 29 and all the three in the islands were productive, whereas the remaining were devoid of the vegetation. Out of the 38 sampling stations in the mainland, 9 (30-38) were not approachable and therefore could not be covered in detail. Sampling of 93 quadrats in the mainland and 54 quadrats in the islands was done covering a maximum vertical distance of 4000 m and 301 m into the sea respectively. The coast is mostly sandy, but marshy near Tuticorin. And near Vembar, Vembar river joins the sea and forms the boarder line between the Ramnathapuram and Tirunelveli districts. The rivers, Vaipar near Vaipar and Thamravarni near Punnakkayal and a rivulet Vappalodai near Vappalodai also joins the sea in this sector. All the three islands are situated 12 km off the mainland. One sampling station for each of the island was located on the western side facing the mainland.

#### Sector IV

The coastline extends to 104 km and is divisible into 42 sampling stations (Sector IV, Fig. 1). Of these, 25, viz. 8, 9, 16, 17, 19 to 23, 26, 27, 28, 30 to 42 were productive, whereas the rest were devoid of the vegetation. No island is situated in this sector. Sampling of 408 quadrats was done covering a maximum vertical distance of 414 m into the sea. The coast is mostly sandy. The river Athankarai joins the sea between Vallanvillai and Kuthankuli (i.e. Station Nos. 29 and 30).

#### Sector V

The coastline extends to 45 km and is divisible into 15 sampling stations (Sector V, Fig. 1). Of these, 3, viz. 1, 2 and 10 were productive, whereas the remaining were devoid of the vegetation. No island is situated in this sector also. Sampling of 51 quadrats was done covering a maximum vertical distance of 711 m into the sea. The coast is mostly sandy, and partly rocky.

#### THE PROFILES

The profile gradients of the sampling areas are calculated from the sampling depth against sampling distance data (Tables 31 - 35). The shore gradually slopes towards the sea. The profiles of sea bottom which fall within the potential area surveyed are constructed from the angles of intersections recorded with a sextant (Sector II Fig. 2 -- 14, Sector III Fig. 2 -- 12, Sector IV Fig. 2 -- 27, Sector V Fig. 2 -- 5). A steep slope of the shore is noticed in the south of Valinokkam at station number 8 of the II Sector (Sector II, Fig. 8) which supports marine algal vegetation. The shores at Kanyakumari (South) and Muttam in the V sector also show steep slopes.

#### HORIZONTAL DISTRIBUTION

#### II Sector

A list of the marine algae collected during the II sector survey includes 74 species in all. Of these, 20 species are in minor quantities and are designated as rare (less than 6 g in a quadrat). These do not figure in the standing crop estimates. The remaining 54 species are found in estimable quantities; 29 species in the mainland and 40 species in the islands. In their distribution 25 species

occur continuously at any depth zone. And 18 species discrete besides being continuous, whereas 29 species are discrete exclusively. Thus, altogether 47 species show discrete distribution (Table - 36).

The horizontal distribution -- the stationwise occurrence of 21 abundant marine algae is shown in diagrams (Sector II, Fig. 15 - 20). Of these, 8 species, viz. Padina gymnospora, Amphiroa fragilissima, Pocockiella variegata, Sargassum ilicifolium, Sargassum plagiophyllum, Sargassum wightii, Gelidiella acerosa and Gracilaria corticata are found both in the mainland and in the islands. Others are localised: 3 species, viz. Turbinaria conoides, Turbinaria ornata and Gracilaria edulis are found in the mainland alone while seven other species, viz. Ulva reticulata, Halimedia gracilis, Lyngbya majuscula, Padina tetrastromatica, Stoechospermum marginatum, Sargassum tenerrimum and Sargassum swartzii in the islands alone.

Species of Sargassum are most widely distributed, being found at all the potential stations except Station No.3. Purbinaria species occur only at two stations, Station No.0 and 1. Gelidiella acerosa is distributed at Station No. 0, 5, 17, 18, 19 and 21, less frequent in the mainland as compared to the islands. Gracilaria edulis and Gracilaria corticata and other agarophytes occur sparsely at Station No. 5, 8, 16 and 18 though Gracilaria edulis occurs in the mainland alone. Among other seaweeds, species of Padina occur at Station No.1, 16, 17, 19, 20 and 21 mostly in the islands. Ulva reticulata occurs in the islands at Station No.17, 19 and 21.

#### III Sector

A list of the marine algae collected during the III Sector survey includes 52 species in all. Of these 13 species are in minor quantities and are designated as rare (less than 5 g in a quadrat). These do not figure in the standing crop estimates. The remaining 39 species are found in estimable quantities: 32 species in the mainland and 17 species in the islands. In their distribution 3 species occur continuously at any depth zone, and 11 species discrete besides being continuous, whereas 24 species are discrete exclusively. Thus altogether 36 species show discrete distribution (Table = 37).

The horizontal distribution — the stationwise occurrence of 13 abundant marine algae — is shown in

diagrams (Sector III Fig. 13 - 17). Of these, 6 species, viz. Gracilaria edulis, Gracilaria foliifera, Sargassum wightii, Hypnea valentiae, Spyridia insignis, and Caulerpa scalpelliformis are found both in the mainland and in the islands. Others are localised: 3 species, viz. Gracilaria corticata, Champia purvula and Grateloupia filicina in the mainland alone, while four other species, viz. Hypnea musciformis Hypnea pannosa, Padina gymnospora and Cystoseira trinodis in the islands alone.

Gracilaria edulis, Gracilaria corticata and/or Gracilaria foliifera occur at Station No.19, 23, 39, 40 and 41.

Sarqassum wightii occurs at Station No.19 and 40. Cystoseira trinodis occurs in the island at Station No.40 only. Spyridia insignis is most widely distributed being found at Station No.19, 23, 39 and 41.

#### Sector IV

A list of the marine algae collected during the IV sector survey includes 110 species in all. Of these 27 species are in minor quantities and are designated as rare (less than 5 g in quadrat). These do not figure in the standing crop estimates. The remaining 83 species are found in estimable quantities. In their distribution 12 species occur continuously at any one depth zone, and 43 species discrete besides being tontinuous, whereas 28 species are discrete exclusively. Thus, altogether 71 species show discrete distribution (Table 38).

The horizontal distribution -- the stationwise occurrence of 36 abundant marine algae -- is shown in diagrams (Sector IV, Fig. 28-34). Enantiocladia prolifera, Corynomorpha prismatica and Laurencia indica are the most widely distributed in the sector. Gracilaria fergusonii and Gracilaria corticata are distributed from Tiruchendur to Cape Comorin, whereas other species of Gracilaria are found less frequently except Gracilaria compressa with limited distribution (in Station No.32, Idinthakarai area). In this Sector, species of Sargassum are well represented in the Idinthakarai area (Station No.33 and 36) and are scarcely represented in other parts. Ulva fasciata, Caulerpa scalpelliformis, Cheilosporium spectabile and Amphiroa anceps are again widely distributed down south of Manapad. Leyringia borgesenii is moderately distributed from Manapad to Cape Commorin.

The region between Manapad to Cape Comorin is more productive in the sector and particularly in the Idinthakarai area.

#### Sector V

A list of the marine algae collected during the V sector survey includes 38 species in all. Of these 13 species are in minor quantities and are designated as rare (less than 5 g in a quadrat). These do not figure in the standing crop estimates. The remaining 25 species are found in estimable quantities. In their distribution 6 species occur continuously at any one single depth and 7 species discrete besides being continuous, whereas 12 species are discrete exclusively. Thus, altogether 19 species show discrete distribution (Table 39).

The horizontal distribution -- the specieswise occurrence of 13 abundant marine algae -- is shown in diagrams (Sector V, Fig. 6 - 8). Sargassum vulgare, Gracilaria corticata and Ulva lactuca are widely distributed. Certain species occur localized at one or the other sampling station only. Sargassum wightii, Botryocladia leptopoda and Laurencia indica were found at Kanyakumari (Station No. 1), whereas Sargassum ilicifolium, Ulva fasciata, Pocockiella variegata, Valoniopsis pachynema, Amphiroa fragilissima, Laurencia paniculata at Kadiapattanam (Station No. 10). The Cape Comorin region is more productive in the sector.

#### VERTICAL DISTRIBUTION

In order to bring out the changes in the standing crop in passing from one depth to another upto 4.0 m, vertical distribution diagrams are drawn. The vertical range together with the variation in density  $(g/m^2$  upto a minimum of 5 g) for each of the species are represented in figures.

#### II Sector

In the mainland the estimable vegetation consists of 29 species (Sector II, Fig. 21). The 0.5 m depth is most productive with only 5 species. The maximum number of species 14 occur at 1.5 m, and the minimum 3 and 4.0 m. Gracilaria corticata alone shows the maximum vertical range and also the most abundant seaweed, at 0 m. Gelidiella acerosa extends from 0.5 to 1.5 m depth. Species of Sargassum are found discontinuously upto 1.5 m, Sargassum wightii being most abundant at 0.5 m depth.

In all the six islands 40 species are represented. In Upputhanni island the vegetation consists of 14 species (Sector II, Fig. 22). The 1.0 m depth is most productive and rich in species abundance, with 11 species. At 2.0 m depth a

single species is represented and 4.0 m depth is devoid of any seaweeds. Wider vertical range is shown by three brown algae, viz. Stoechospermum marginatum, Colpomenia sinuosa and Padina gymnospora. However, Sargassum tenerrimum is the most abundant seaweed at 1.5 m depth. In Suli island the vegetation consists of 12 species (Sector II, Fig. 23). The 1.0 m depth is most productive and rich in species abundance, with 9 species. At 0 m depth a single species is represented, and the 4.0 m depth is devoid of any seaweeds. Sargassum wightii shows maximum vertical range, and also the most abundant seaweed, at 2.0 m depth. Wider vertical range is shown by Padina tetrastromatica, Ulva reticulata, Pocockiella variegata, Hypnea valentiae, and Padina gymnospora. Gelidiella acerosa extends from 0.5 to 1.0 m depth. In Nallathanni island the vegetation consists of 10 species (Sector II, Fig. 24). The 0 m depth is most productive and rich in species abundance with 6 species. At 2.0 m depth minimum number of 2 species are represented and 4.0 m depth is devoid of any species. Hypnea musciformis shows the maximum vertical range discontinuously from 0 to 2.0 m depth. And Sargassum wightii is the most abundant seaweed, at 0 m depth. In Yanaiparai island the vegetation consists of 21 species (Sector II, Fig. 25). The intertidal is the most productive and rich in species abundance with 11 species. At 2.0 m depth a single species is represented and the 4.0 m depth is devoid of any seaweeds. Wider vertical range is shown by <u>Ulva reticulata</u>, (discontinuously) Turbinaria ornata and Halimeda gracilis. And <u>Gracilaria</u> crassa is the most abundant at the intertidal. In Pallayamunai island the vegetation consists of 12 species (Sector II, Fig. 26). The 0.5 m and 1.0 m depths are the more productive with 5 species are represented and both 0 m and 4.0 m depths are devoid of any species. Wider vertical range is shown by Halimeda gracilis, Amphoroa fragilissima and Padina tetrastromatica (discontinuously). And Halimeda gracilis is the most abundant at 1.0 m depth. In Nandamukhi island the vegetation consists of 11 species (Sector II, Fig. 27). The 0.5 m depth is the most productive, with 5 species. The maximum number of species 6 occur at 0 m depth and a minimum 3, both at 0.5 m and 2.0 m depths. And the 4.0 m depth is devoid of any seaweeds. Sargassum wightii shows the maximum vertical range, followed by Hypnea pannosa (discontinuously), Turbinaria ornata and Caulerpa racemosa. At 0 m depth Gelidiella acerosa is found in a small quantity. And Sargassum wightii is the most abundant species in depths ranging from intertidal to 1.5 m.

#### Sector - III)

In the mainland the estimate vegetation consists of 32 species (Sector III, Fig. 18). The 1.5 m depth is most productive with only 6 species. The maximum number of species, 14 occur at 0.5 m, and the minimum 3, at 4.0 m.

Jania adhaerens shows the maximum vertical range, discontinuously. Caulerpa scalpelliformis is the most abundant species and occurs at 1.5 m depth. Species of Gracilaria extend from 0 m to 1.5 m depth, of which Gracilaria corticata is most abundant at 0.5 m. Sargassum wightii extends from 0.5 m to 1.0 m, being abundant at 1.0 m depth.

In all the three islands 17 species are represented. In Karaya island the vegetation consists of 10 species (Sector III, Fig. 19). The 2.0 m depth is the most productive with a minimum of 4 species, though the species abundance of 8 species is seen at 1.0 m depth. The 0 m, 0.5 m, 4.0 m depths are devoid of any seaweeds. Wider vertical range is shown by three species, viz. Hypnea musciformis, Padina gymnospora and Spyridia insignis. Hypnea musciformis is also the most abundant at 2.0 m depth. In Challi island the vegetation consists of 9 species (Sector III, Fig. 20). The 2.0 m depth is most productive and rich in species abundance with 6 species. At 0.5 m depth two species are represented and 0 m and 4.0 m depths are devoid of any vegetation. Wider vertical range is shown by two seaweeds, Hypnea valentiae and Padina gymnospora. However, Sargassum wightii is the most abundant seaweed at 2.0 m depth. In Van island the vegetation consists of 7 species (Sector III, Fig. 21). The 2.0 m depth is most productive and rich in species abundance, with 5 species. At 1.0 m depth a single species is represented, and 0 m, 0.5 m and 4.0 m depths are devoid of any seaweeds. Wider vertical range is shown by Spyridia insignis, Hypnea musciformis, Gracilaria edulis and Hypnea valentiae. And Caulerpa scalpelliformis is the most abundant, at 2.0 m depth.

#### Sector IV

In the sector the estimable vegetation consists of 83 species (Sector IV, Fig. 35). The 1.5 m depth is more productive with 50 species. The maximum number of species 63 occur at 2.0 m, and minimum of 34 species at 4.0 m. 16 species show maximum vertical range out of which 7 species, viz. Sargassum wightii, Gracilaria corticata, Laurencia indica, Enantiocladia prolifera, Gracilaria fergusonii, Grateloupia

lithophila, and Corynomorpha prismatica occur at all depths and 9 species, viz. Caulerpa scalpelliformis, Sargassum plaqiophyllum, Ulva fasciata, Laurencia flagelliformis, Amphiroa anceps, Hypnea musciformis, Sargassum vulgare, Gelidiopsis variabilis and Agardhiella robusta occur discontinuously. Sargassum plagiophyllum is the most abundant species at 0 m depth and again at 2.0 m depth, whereas Sarqassum wightii is the most abundant species showing maximum continuous vertical range. Gracilaria corticata and Gracilaria fergusonii are most abundant at 0.5 m depth, whereas Gracilaria foliifera is abundant from 1.5 m to 2.0 m depth. Hypnea musciformis is most abundant at 0 m depth, and less abundant from 1.0 m to 4.0 m depths. Hypnea spinella occurs at 0 m and 2.0 m depths, being most abundant at 0 m. Hypnea spicifera occurs from 1.5 to 2.0 m, whereas Hypnea valentiae occurs only at 2.0 m depth. Cheilosporium spectabile occurs at 0 m and at 1.0 to 2.0 m depths. 22 species show occurrence only at one single depth of which 8 species at 0 m, 1 species each at 0.5, 1.0 and 4.0 m, 4 at 1.5 m, and 7 at 2.0 m depths. In the whole survey ( in all the 5 sectors) maximum sampling density (biomass) was recorded north of Kaduthalai near Idinthakarai, as 13135 g/m<sup>2</sup> constituting 99% the species of Sargassum.

## V. Sector :

In the sector the estimable vegetation consists of 25 species (Sector V, Fig. 9). The maximum number of species 11 occur at 0.5 m and minimum 2 species at 2.0 m.

5 species show maximum vertical range, out of which 3 species viz. Laurencia indica, Amphiroa anceps, Gracilaria fergusonii, occur at all depths from 0 to 1.0 m, and 2 species, viz.

Gracilaria corticata and Botryocladia leptopoda occur distontinuously. Sargassum vulgare is the most abundant species at 0.5 m depth, whereas Laurencia indica is the abundant species showing maximum continuous vertical range.

Gracilaria corticata, Sargassum ilicifolium and Valoniopsis pachynema are most abundant at 1.5 m depth. 13 species show occurrence only at one single depth of which 3 species at 0 m, 0.5 m and 1.0 m depths, 2 species at 1.5 m and 2.0 m, and 2 species at 4.0 m depths.

#### SUBSTRATA, COVER AND DENSITY

The area under different substrata in the mainland and islands is divisible into sand, mud, rock and coral, and the corresponding percentage cover, biomass and density values at different depths for the sector II, III, IV and V are given (Tables 40 - 43). The maximum standing crop values at any depth zone and the associated cover and the substrata are given below to suggest their relationship.

#### II Sector

In the mainland the 0.5 m depth zone is more productive with a biomass  $22448 - 59678 \text{ kg., density } 1.932 \text{ kg/m}^2$ , cover 10% and sand, coral and rock substrata. In the islands: Upputhanni 1.0 m depth zone is more productive with a biomass 15363 -- 16634 kg., density 0.227 kg/m $^2$ , cover 16.66%, and sand and rock substrata; Shuli 0.5 m depth zone is more productive with a biomass 14363 -- 17082 kg., density 0.59 kg/m<sup>2</sup>, cover 33.33%, and sand and rock substrata; Nallathanni 2.0 m depth zone is more productive with a biomass 113424 - 204959 kg., density 0.04 kg/m<sup>2</sup>, cover **8.33**% and sand substrata; Yanaiparai 1.0 m depth zone is more productive with a biomass 14521-20053 kg., density 0.351 kg/m<sup>2</sup>, cover 25% and sand and rock substrata; Palliamuni 1.5 m depth zone is more productive with a biomass  $25573-34505 \text{ kg., density 0.189 kg/m}^2$ , cover 6.25%, and sand and mud substrata, and Nandamukhi interdial zone is more productive with a biomass 1490--2840 kg., density 0.259 kg/m<sup>2</sup>, cover 12.5% and sand substrata.

#### III Sector

In the mainland 2.0 m depth zone is more productive with a biomass 171572 kg., density 0.479 kg/m², cover 7.7%, and sand and mud substrata. In the islands: Karaya 2.0 depth zome is more productive with a biomass 42581--155119 kg., density 0.392 kg/m², cover 35%, and sand, coral and rock substrata; Challi 2.0 m depth zone is more productive with a biomass 13102--27315 kg., density 0.33 kg/m², cover 41.66% and sand and rock substrata and Van 2.0 m depth zone is more productive with a biomass 119603 -- 250146 kg., density 0.54 kg/m², cover 45% and sand and mud substrata.

#### IV Sector

In this sector 2.0 m depth zone is more productive with a biomass 645287-2281800 kg., density 0.606 kg/m<sup>2</sup>, cover 33.8%, and sand and rock substrata.

In this sector 1.5 m depth zone is more productive with a biomass 103161-112219 kg., density 3.025 kg/m<sup>2</sup>, cover 16.66% and sand and rock substrata. The highest mean density value was recorded here because of thick population in the potential area.

The substrata cover and density values given here are based on the productive area only, and do not cover the entire area surveyed.

The nature of substratum, cover and density (g/m<sup>2</sup>wet) of the marine algae at each station where the marine algae are found, are diagramatically shown (Sector II, Figs. 28-39; Sector III, Figs. 22-31; Sector IV, Figs. 36-60; Sector V, Figs. 10 - 12).

No analysis of the substrate and percentage cover of the marine algae in the I sector was made. However, the marine algae have been listed according to their occurrence in the sector found both in estimable quantities (5  $g/m^2$  and above), and as rare (less than 5  $g/m^2$ ). In all 155 species recorded are distributed as follows: In the Gulf of Mannar mainland 57 species, Gulf of Mannar islands 123 species and in the Palk Bay 48 species (Table 44). Thus the I sector represents the richest marine algal beds in quantities as well as their variety of the species.

#### PRACTICAL CONSIDERATIONS

The resources of the marine algae given in the present survey are most reliable as they are based on the sampling method devised to estimate the intertidal and sub-tidal populations at the same time, employing divers to take out the samples. However, it is evident that some of the smaller seaweeds like Gelidiella acerosa resources appear low. These can only be estimated properly by taking the samples more closely in the sampling area. The resources estimates for the few species, viz. Gelidiella acerosa, Gracilaria edulis, species of Sargassum, and species of Turbinaria will fall much short of their gross production primarily because of heavy commercial harvesting that might have preceded the time of the survey. The loss by other avenues e.g. herbivory may not be much. It is likely that these species hardly reach their stady stata levels. The resources can be better understood, if resurveys are undertaken.

Michanek (1975) classified the Indian Seaweed Resources as moderate considering the richest seaweed beds anywhere in the world which exceed a million ton mark. As already pointed out this survey reveals the resources of several hitherto little known economic seaweeds.

The regrowth and recouperation of economic seaweeds from the Mandapam region have been studied only recently. ·Although species of Sargassum are known to take two years for recouperation (Chauhan and Krishnamurthy, 1968) on the Gujarat coast, the reports of 4 year recouperation period for Sargassum spp., and 2-3 years for Gracilaria spp., (Varma 1962) are equivocal. As pointed out by Umamaheswara Rao (1968), Raju and Thomas (1971) and Rama Rao and Subbaramaiah (1979), many seaweeds including species of Sargassum, Gracilaria and Gelidiella acerosa attain their maximum size in Mandapam region in a few months (within a year). Therefore it is suggested that on the available evidence, the marine algae would stand systematic harvesting upto 90 per cent of their biomass, annually. However, indescriminate harvesting of any species will deplete the resources. Now the Gelidiella acerosa resources need conservation and planned harvesting practices.

Besides a few seaweeds exploited from this region, several marine algae found in abundance should now be harvested and utilized. From the findings it would appear that besides the species of <a href="Sargassum">Sargassum</a>, <a href="Turbinaria">Turbinaria</a> and <a href="Gracilaria">Gracilaria</a> which are being exploited, many others, viz. <a href="Hypnea valentiae">Hypnea valentiae</a> (Rama Rao and Krishnamurthy 1978), <a href="Laurencia">Laurencia</a> papillosa, <a href="Acanthophora spicifera">Acanthophora spicifera</a>, <a href="Gelidiella indica">Gelidiella indica</a>, and <a href="Gracilaria">Gracilaria</a> corticata (Subba Rao et al. 1977). <a href="Padina gymnospora">Padina gymnospora</a> (Chennubhotla et al. 1977) from Mandapam region have been shown to be the resources for the phycocolloids. <a href="Many of the abundant species should be likewise examined from the point of view of their utilization">Many of the abundant species should be likewise examined from the point of view of their utilization. <a href="In addition">In addition</a>, the seaweeds can be made use of as manure and fertilizer or as fuel in the neighbouring coastal areas.

Significantly estimable quantities of the seaweeds are found in the survey upto a depth of 4.0 m. The deeper waters which lie in continuity with the coastal belt are not productive of the marine algae. However, seaweeds have been found entrangled in fishing nets at greater depths in the offshore waters. Rare deep water forms are also found occassionally in the drift. Therefore, it would be worthwhile investigating the off-shore waters for the marine algal resources that may form the deep-sea beds.

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Table - 1

Marine Algal Survey in the I Sector 1971-72

Mainland and Islands between Thonithurai (Mandapam) and Kilakkarai, & Mainland between Rameshwaram and Athankarai.

Sr.		Depthwise Es Depth			*** *** *** *** *** *** *** *** *** **	***			******************	
No.	Species	in	Gulf of Mannar Mainland	Gulf of Mannar Islands	Palk Bay	Total	Gulf of Mannar Mainland	Gulf of Mannar	urvey Palk Bay	Total
1.	2.	3.	4.	5.	6.	o. 7.	8.	9.	10.	11.
1.	Gelidiella acerosa	Intertidal	<b>=</b>	43	142	185	155		-	155
feriye		0.0 0.5 1.0 1.5 2.0 4.0	4820 670 4259	2525 34797 - -	460 842 671 11521 9328	2985 40459 1341 15780 9328		15153 6823 - 2309	894 8718 4777	16047 15541 4777 2309
	Total	• • •	9749	37365	22964	70078	155	24285	14389	<b>3</b> 8829
2.	Gracilaria edulis	Intertidal 0.0 0.5 1.0 1.5 2.0	97550	30305 127588 8180 26550 18788	13422	30305 141010 8180 124100 18788	160	71 126274 77781	398	71 126672 77941 -
	Tota1		97550	211411	13422	322383	160	204126	398	204684
3.	Gracilaria corticata	Intertidal 0.0 0.5 1.0 1.5	507	1365	101 14365 13051 6760	101 14365 13558 8125	6026 32755 - -	50102	16345	6026 32755 16345 - 50102
		4.0		6263	-	6263	··· <del>-</del>	- 30102		-
	Total	• • •	507	7628	34277	42412	38781	50102	16345	_105228

		•	) and the first time that the first time the first time the first time time the first time time time time time time time tim			-				
1.	2.	3.	4.	5.	6.	7.	8. 1. 1 2.	9.	10.	11.
4.	Other Gracilaria sp.	Intertidal 0.0 0.5 1.0	11139 32988 59116	72817 42302 43968	8143	11139 113948 101418 43968	- - -	92791	2386 5448	2386 98239
		1.5 2.0 4.0	37247 -	1154 37577	1602	1154 74824 1602		1155 25051	-	1155 25051 -
	Total	o • •	140490	197818	9745	348053	-	118997	7834	126831
5.	Hypnea sp.	Intertidal 0.0 0.5 1.0 1.5	185 1523 - 23945	7 35356 110531 37833 93505 43839		7 35541 112054 37833 93505 67784	193 5526 - 291	85 33673 293384 52148 27704	2088 6810 - 16566	278 41287 300194 52439 44270
71 -		4.0		<b>-</b> ' · · · ·	2 <b>1</b> 628	21628	3277	•	•	3277
	Total	• • • ·	25653	321071	21628	368352	9287	406994	25464	441745
	Grand Total	#	273949	<u> </u>	102036	1151278	48383	804504	64430	917317
Algi	nophytes		en de la companya de La companya de la co				•	<b>.</b>		
1.	Sargassum sp.	Intertidal 0.0 0.5 1.0 1.5 2.0 4.0	119 49251 32222 5030 5324 5320	180992 4593176 128836 1212083 284956	4969 70291 83360 171125 170249 355610,	5088 300534 4708758 304991 1387656 645886	8508 133178 71905 250361 236491 189072	1062 263068 230613 55216 235490 <b>57</b> 6175	62111 54713 3313	9570 396246 364629 360290 475294 765247
	Total	• • • • • • • • • • • • • • • • • • •	97266	6400043	855604	7352913	889515	1361624	120137	2371276
								· · · · · · · · · · · · · · · · · · ·		-3- ···································

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										28
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
2.	Turbinaria sp.	Intertidal	<b>-</b> 924	— · · · · · · · · · · · · · · · · · · ·	646 52084	646 53008		71 167523	1392	71 168915
		0.5 1.0 1.5	74466 97914	204688 - -	103568 27515 26241	382 <b>7</b> 22 1254 <b>2</b> 9 26241	27,487 -	4094 - 4617	74097 119412 103535	105678 119412
		2.0	7095 -		34978	42073 -		- 4017	6036.	108152 6036 -
	Total	• • •	180399	204688	245032	630119	27487	176305	304472	508264
3.	Padina sp.	Intertidal 0.0 0.5	409 2218 4 <b>8</b> 21	503 61453 105 <b>7</b> 54	538 1684	912 64209 112259	103 25226 9015	170 63137 45714	- 5567 26969	273 93930 81698
		1.0 1.5 2.0	•	31698 62335 12526	1006	32704 62335 12526	9880 <b>7</b> 383 46884	4090 808 <b>1</b>	868 - -	14838 1 <b>546</b> 4 46884
	Total	4.0	7448	<del>-</del> 274269	3228	284945	98491	121192	33404	253087
4.	Hormophysa sp.	Intertidal	- -		-	• · · · · · · · · · · · · · · · · · · ·		<b>-</b> 15995	••• · · · · · · · · · · · · · · · · · ·	<b>-</b> 15995
		0.5 1.0 1.5		• • • • • • • • • • • • • • • • • • •	<b>-</b>	<b>3</b> (Am)	-	2729 -		2729
		2.0 4.0	<b>-</b>				_	<b>→</b> . <b>→</b> 7	. * <b>-</b> 1	
-	Total	• • •	-	. <b>-</b>	·		, <b>≟</b>	18724		18724
5.	<u>Cystoseira</u> <u>trinodis</u>	Intertidal 0.0 0.5	- -	 	• • • • • • • • • • • • • • • • • • •	••••••••••••••••••••••••••••••••••••••	-	3 <b>3</b> 673	-	33673
		1.0 1.5 2.0	••• • • • • • • • • • • • • • • • • •		••• • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • •	-	-		- -
	Total Grand Total	4.0	285113	6879000	1103864	8267977	1015493	33673 1711518	458013	33673 3185024

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Othe	r Seaweeds		14 .							
1.	Enteromorpha spp.	Intertidal 0.0 0.5	3234	4630		<b>-</b> 7864	- 1 - 48 - 1	56 37882	2882	56 40 <b>7</b> 64
		1.0 1.5 2.0			Pin			300	- -	-
		4.0	_				• • •	# 1 ( )	- -	
	Total .	• • •	3234	4630	• *** · · · · · · · · · · · · · · · · ·	7864	<u> </u>	37938	2882	40820
2.	Ulva spp.	Intertidal 0.0 0.5	1175 16910 22 <b>7</b> 08	<b>-</b> 5051 50489	9231 13981 11368	10406 35942 84565		- 74922 192406	- 398 4 <b>578</b> 6	- 75320 238172
		1.0 1.5 2.0 4.0	-	17383 5772 31314	9731 - 973-1	27114 55772 31314		40900 11544 75153	63397 59636	104297 71180 75153
	Total		40793	110009	44311	195113	en grand and a second a second and a second	394925	169197	564122
3.	Chaetomorpha spp.	Intertidal 0.0 0.5	89	<b>28</b>	<b>-</b> 4609	117 4609	723	<b>-</b> , , ,	-	721
		1.0 1.5	<b>-</b>	-	211	211		- 1 <b>3</b> 852		<b>13</b> 852
		2.0 4.0			<b>-</b>	<u> </u>		. <b>-</b>	<b>-</b>	-
	Total	• • •	89	28	4820	4937	721	13852	-	14573
4.	Cladophora spp.	Intertidal 0.0 0.5	• 546. • 18. 1	- 421 2729		421	_ 77	184 2525	<b>-</b>	261 2525
	en e	1.0		10225 1154		2729 10225	-	2046	# # # # # # # # # # # # # # # # # # #	2046
		2.0 4.0	<u>-</u>	- Y		1154		on the original state of the s	••••••••••••••••••••••••••••••••••••••	6917
, , , , , , , , , , , , , , , , , , ,	Total		•	14529	• • • • • • • • • • • • • • • • • • • •	14529	6994	4755	• • • • • • • • • • • • • • • • • • •	11749

hizoclomium Total	Intert 0.0 0.5 1.0 1.5 2.0 4.0	idal	-		154 -	_ 154 _	- -		-	000 000 000 000 000 000 000 000 000 00
Total	2.0									
Total		•	. •						-	-
	• • •		. <del></del>	. <del>-</del>	154	154	. <del>-</del>	· -	-	
Bryopsis	Intert 0.0 0.5	idal		- -	<b>5</b> 070	5070			-	7 <b>.</b> 7 . <b>.</b>
	1.0 1.5 2.0		-		1280	1280				-
Total	4.0		••• · · · · · · · · · · · · · · · · · ·		6350	6350	- - - -			••••••••••••••••••••••••••••••••••••••
Caulerpa sp.	0.0	idal	22 185	<b>-</b> 2526	- 307	22 3018 300565	39 240	- 147319	5269 8718	39 152828 97415
	1.0 1.5		17269 533	223930 39248	2349 42243	243548 82024	291 2768	40900 2181 <b>7</b> 3	37169 19713	78360 240654
	4.0	· ·	8508		16022	24530	<b>5</b> 074	-	72070	124742
Total	, •••	***	67364	524295	185967	777626	6412	604687	82999	694038
Codium spp.	0.0	idal	- · · · · · · · · · · · · · · · · · · ·	6314 62771	-	- 6314 62771	1	39566 40937	- 8 VG - 1 8 T	39566 40937
	1.5 2.0	*		14315 1154 31314		1154 31314				
Total	• • •		• • • • • • • • • • • • • • • • • • •	115868	••	115868	-	80503	-	80503
	Total	1.5 2.0 4.0 Total Paulerpa sp. Intert 0.0 0.5 1.0 1.5 2.0 4.0 Total Podium spp. Intert 0.0 0.5 1.0 1.5 2.0 4.0 4.0 1.5 2.0 4.0	1.0 1.5 2.0 4.0  Total  Paulerpa sp.  Intertidal 0.0 0.5 1.0 1.5 2.0 4.0  Total  Codium spp.  Intertidal 0.0 0.5 1.0 1.5 2.0 4.0  Intertidal 0.0 0.5 1.0 1.5 2.0 4.0	1.0 1.5 2.0 4.0  Total   Paulerpa sp.  Intertidal 0.0 185 0.5 38185 1.0 17269 1.5 533 2.0 2662 4.0 8508  Total  Intertidal 0.0 67364  Codium spp.  Intertidal 0.0 - 0.5 - 1.0 - 1.5 2.0 4.0	1.0 1.5 2.0 4.0  Total   Intertidal 22 - 0.0 185 2526 0.5 38185 258591 1.0 17269 223930 1.5 533 39248 2.0 2.0 2662 4.0 8508  Total   Total   Intertidal 0.0 8508 - Total  Intertidal 0.5 67364 524295  Intertidal 0.5 - 6314 0.5 - 62771 1.0 - 14315 1.5 - 1154 2.0 - 31314	1.0 1.5 2.0 4.0  Total  Intertidal 22 - 0.0 1.5 38185 2526 307 0.5 38185 258591 3789 1.0 1.0 17269 223930 2349 1.5 533 39248 42243 2.0 2662 - 121257 4.0 8508 - Total  Intertidal 0.0 67364 524295 185967  Total  Intertidal 0.0 6314 - 0.5 62771 - 1.0 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	1.0 1.5 2.0 4.0  Total  Intertidal 0.5 38185 2526 307 3018 0.5 38185 258591 3789 300565 1.0 17269 223930 2349 243548 1.5 533 39248 42243 82024 2.0 2662 2.0 2662 2.0 2662 2.0 2662 307 1002 24530  Total  Intertidal 0.0 8508 Total  Intertidal 0.0 67364 524295 185967 777626  Fodium spp.  Intertidal 0.0 67364 524295 185967 777626  Fodium spp.  Intertidal 0.0 6314 0.5 67364 524295 185967 777626  Fodium spp.  Intertidal 0.0 6314 0.5 62771 1.0 14315 1.5 1.5 1.5 1.5 1.5 1.5 1.54 2.0 31314 4.0	1.0 1.5 2.0 2.0 4.0  Total   Intertidal 22 - 239 0.0 185 2526 307 3018 240 0.5 38185 258591 3789 300565 - 1.0 17269 223930 2349 243548 291 1.5 533 39248 42243 82024 2768 2.0 2662 - 121257 123919 3074 4.0 8508 - Total  67364 524295 185967 777626 6412  Codium spp.  Intertidal 0.5 6314 - 0.5 6371 - 1.0 14315 - 1.5 1.5 1.5 1.154 - 1.5 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.5 1.5 1154 - 1.	1.0 1.5 2.0 4.0  Total   Intertidal 22 - 0.5 38185 2526 307 3018 240 147319 0.5 38185 258591 3789 300565 - 88697 1.0 17269 223930 2349 243548 291 40900 1.5 533 39248 42243 82024 2768 218173 2.0 2662 - 121257 123919 3074 109598 4.0 8508 - 16022 24530 - Total  67364 524295 185967 777626 6412 604687  1.0	1.0 1.5 2.0 4.0

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1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	
) .	Halimeda gracilis	Intertidal 0.0 0.5 1.0 1.5	2409 4990 76115 35544	- 66504 441442 161557 49638	615 211	2409 72109 517768 197101 49638		203300 901306 289370 527545	21793 294841 954181	203300 923099 584211 1481726	3
		2.0 0 0 0 4.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	585305 -	12525		597830	••••••••••••••••••••••••••••••••••••••	175357	253488 -	428845 	
	Total		704363	731666	826	1436855	-	2096878	1524303	3621181	
LO.	Halimeda macroloba	Intertidal	·	<b>-</b> 842	- i	<b>-</b> 842	6 641		<b>100</b>	641	
		0.5 1.0 1.5	19750 55030 2662	10917 59306 15007	- - 2560	30667 64336 20229	1539 - 3922	47035 10389	7355 3040 2485	8894 50075 <b>1</b> 6796	
		2.0 4.0	46115 67115	194145 -	5830 <b>-</b>	246090 67115	7686 <del>-</del>	18789 <sub>.</sub>	57377 7265	83852 <b>7</b> 265	
	Total	• • •	140712	280217	8390	429319	13794	76213	77522	167529	
1.	Udotea flabellum	<pre>Intertidal 0.0 0.5</pre>	 	682	 	<b>-</b> - 682	-	- -	- - -	-	
		1.0 1.5 2.0 4.0	- · · · · · · · · · · · · · · · · · · ·	30013 112730	- 111930 28838	30013 224660 28838	2325 3692 10760 19622	-	<b>-</b>	2325 3692 10760 19622	
	Total	•••	_	143425	140768	284193	36399	· <b>-</b>		36399	
2.	Microdictyon spp.	<pre>Intertidal 0.0 0.5 1.0</pre>	- - -	- - -	_			- - -	-	- -	
		1.5 2.0 4.0	<u> </u>	erionista de la companya della companya della companya de la companya de la companya della compa			3692 13066			3692 13066	
	Total	o <sub>n de l</sub> a <b>e • •</b> • • • • • • • • • • • • • • • • •		and the second s	• • • • • • • • • • • • • • • • • • •	e e e e e e e e e e e e e e e e e e e	16758		- · · · · · · · · · · · · · · · · · · ·	16758	

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1.	2.		449 No. 609 No. 609 No. 609 No. 609 No. 609	The state of the s	an was state from which wind while while was easy o					32
****	C. 9	3.	4.	5.	6.	7,	8.	9.	10.	11.
13.	Dictyosphaeria	Intertidal			en.					From start 16th and 475 and 400 and 400 and
	<u>~</u>	0.0 0.5		421	- ·	421		_	_	
		1.0		1023	••••	4000			-	
		1.5	2 11 2 <b>445</b>	1154		1023 1154		<del></del>		- <b>-</b>
		2.0		-	<b>-</b>	-		_	-	•
		4.0	-	· · · · · · · · · · · · · · · · · · ·	Por	**************************************	<b>-</b> , 4	<b>≟</b>	••	
	To a 1	• • •		2598		0500				•
			. •	2390		2598	-		•	
. 14.	Valoniopsis	Intertidal	-		_		· ·			
		0.0	Pyrame •	2946		<b>-</b> 2946	4004	<del>-</del>		-
		0.5	-	•	_	2040	±004			4004
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15.	Avrainvillea	Intertidal	<b>_</b> ``		• • • • • • • • • • • • • • • • • • •		_		e.	
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16.	Dictyota	Intertidal								**************************************
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21.	Spate	oglossum	asperum	Intertio	lal	•	- · · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	_	-	-
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25. Chnoospora fastigiata	Intertidal		element of the contract of the		-	-			
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26. Galaxaura oblongata	Intertidal				* ·			**1	
not controlled and an analysis	0.0	_	_		<u>-</u> .	<u>.</u>	***		<del></del>
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	4.0		-	<b></b> ,		***		-	J1J1
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10001	•••			<del>-</del> -	_		8904	-	8904
27. <u>Gelidium</u> spp.	Talk and Jan 1				•		•		
27. Geriaiam spp.	Intertidal 0.0	•••·	-	, <del></del>	-	19	• · . · . · . · . · . · . · . · . ·	-	19
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Total	•				, and a	4054			
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28. Chondrococcus hornemanii	Intertidal					**	•	• •	****
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	0.5	-	1365	5 =	1365	_	<b>3</b> 548	817 29962	817
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Total	• • •	887	1365	5 <b>-</b>	2252		9683	36577	46260

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1. 2.		3.	4.	5.	6.	7.	8.	9.	10.	11.
29. Amphiroa f	Fragilissima	Intertidal 0.0 0.5	1848 9134	- 47760	verious 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<b>-</b> 1848 56894	142	18520 1366	- - 15800	142 18520 17166
		1.0 1.5 2.0 4.0	1509 11181 7094 28359	8180 25396 43839	11073 12161 103768 21638	20762 48738 154701 49987	- 16612 104527 819	10225 13852 12525	2606 1657 67899	12831 32121 184951 819
	Total	• • •	59125	125175	148630	332930	122100	56488	87962	266550
30. Amphiroa s	spp.	Intertidal 0.0 .5	- · · · · · · · · · · · · · · · · · · ·	- - 2047		2047	1121	14	·	14 1121
		1.0 1.5 2.0 4.0	-	-			8428	110819 -	- , 	8428 110819 -
	Total	• • •	-	2047	•	2047	9549	110833	-	120382
31. Cheilospor	rium spectabile	Intertidal 0.0	_	<b>-</b>	_		309		<b>-</b>	309
1278-14	e di militari di sensi di sens	0.5 1.0 1.5	-	•••	•• ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	<u></u>		-		- · · · · · · · · · · · · · · · · · · ·
en e		2.0 4.0	<del>-</del> .	<u> </u>	- · · · · · · · · · · · · · · · · · · ·	<b>-</b>		:	<u>-</u>	- · · · · · · · · · · · · · · · · · · ·
	Total	• • •	<b>-</b>	<u>-</u>		-	309		-	309
32. <u>Jania</u> spp.		Intertidal 0.0 0.5		51771	154 1852	51925 1852	780 2322 6266	-	 -	780 2332 6266
		1.0 1.5 2.0 4.0			12801 183052	12801 183052	1162 923 76 <b>96</b>		•	1162 923 7686
	Total	•••		51771	197859	249630	19139		- T	19139

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33. Grateloupia	Intertidal	, <del>"</del>						TO.	11.
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	caT •••		6263	_	6060				
34. Halymenia	· · · · · · · · · · · · · · · · · ·				6263	51.	5 -	-	515
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Tot	al •••	1706				<b>7</b> 14	-	·	<b>-</b>
15 Colidia:		4726	2045		6771	400			
5. Gelidiopsis	Intertidal		* * * * * * * * * * * * * * * * * * * *					-	
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6. Agardhiella		Setting 1	• • • • • • • • • • • • • • • • • • • •	20	3 3. 3 20				<del></del>
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37. Champia		Intertidal	**				393	85		478
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38. Centroceras	clavulatum	Intertidal 0.0	- · · · · · · · · · · · · · · · · · · ·	1684		1684	<u>64</u>		<b>-</b> ,	64
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	Total	• • •		3049		3049	64	_	rise	64
39. Spyridia		Intertidal	t <del>=</del> see	- <u>-</u>		-	. <b>-</b>	170	-	170
S. S		0.0	- 647		<b></b>	647	•	<b>.</b>		-
		0.5	<b>-</b> , 2 + 17 €	<b>-</b>	•		<del>, -</del>		- 3	<b>-</b>
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	<b>6.</b>	4.0	3781	<del></del>	-	3781	-		-	
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40. Nitophyllum	1	Intertidal	tion - Let	•	-	· and the second	•	·	•	
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		• 1	••	and the second						

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41.	Vanvoorstia s	pectabilis	Intertidal	**************************************	-	•			AND MITS THE THE MITS MILE AND MAD THE	A wide wine when river in a large way was and	
			0.0	***	wins	•	_	-	-	-	- No.
			0.5	***	<b>-</b> 4094		<b>-</b> 4094	-			-
		on any article	1.0 1.5		resident of the second of the	-	· هند	•••			<u> </u>
			2.0	•		<b>~</b> .	e e e e e e e e e e e e e e e e e e e	***		•	and the second of the
			4.0			` <b></b>		-	-	-	4.74
				_		<b></b> , ·	- <del></del>	₹		7	
		Total	• •		4094	er i	4094			s. •	e
			Y + 1	73 ···		, •	4034	<del>-</del>	email hough select		
42.	Acanthophora		Intertidal		• • · · · · · · · · · · · · · · · · · ·	-		2617	127		2744
	ev ev	ter er er er es	0.0	1663	12627	14289	28579	38029	34094	199	63322
	•		0.5	• C 1	3411	-	3411	-	40938		40938
			1.0	-	-	<b>~</b>	-	-	- 1 A 1	· •	
			1.5	-	• • •		,	• • • • •	-	<b>-</b> .	•
		1	2.0		<del>-11</del> .	A STATE OF THE STA	in the second se	<b>-</b> ,		_	-
			4.0				-		-	-	***
		Total	• • •	1663	16038	14289	31990	30646	75159	199	106004
43.	Chondria		Intertidal	-	••••••••••••••••••••••••••••••••••••••	444	· •		· · · · ·	_	
			0.0	9240	<u> </u>		9240				
	*d		0.5	<b>-</b> **	- <u>-</u> -	<b>₩</b>	-		_		-
			1.0	-	-	-		-	_		-
			1.5	26622	The state of the s	<u>.</u>	26622	-	-	-	-
	<i>'</i>		2.0		- '	-	<del>-</del>	<b>-</b> '.		<u> </u>	**************************************
			4.0	•		•	-	<b>⊸</b> .	<b>-</b>	-	<b></b>
		Total	• • •	35862	-	<b>-</b>	35862				
44.	Laurencia		Intertidal	521		<u> </u>	521	3351	······································		2254
			0.0		842	9218	10060	1281	1263	***	3351
			0.5	-	14328		14328	- 1201	3411	1636	2544
			1.0	-	15338	. <b>4</b> "	15338	_	2411	1030	5047
			1.5	* * <u>-</u>	42712	•	42712	461	-	1657	2118
		en e	2.0	-	-	· -	~ .	-	or the second second	<u>+</u> .	2110
		in the second of	4.0		and the second	• •	<b>-</b>		er en	distribution of the second	-
		Total	• • •	521	73220	9218	82959	5098	4674	3293	13060
					And the same of th						
				•						•	

1. 2.		3.	4.	5.	6.	7.	8.	9.	10.	11.
4. Other filmen	tous red	Intertidal		_						
		0.0	-			-	-	- '	-	•
		0.5	<b>-</b> · '		_	<b>→</b> 1.5.		й <u>—</u>	->	_
		1.0		-			<b>—</b>	· ••		· -
		1.5	-	-	-		923	••••••••••••••••••••••••••••••••••••••		-
	The second secon	2.0 4.0	-	-	. •••		923	<b>-</b>		923
		<b>4</b> • U		~	-	<b></b> .	•	<del>-</del> .,	<b>-</b>	
	Total							<del>-</del> .	••• ··· ···	-
•		• • •	<b>-</b>	***			923		-	000
1C Term orbacc									-	923
49. <u>Iyngbya</u>		Intertidal		14		1/	· ·		-	
		0.0	739	842		14 1581		** <b>**</b>	-	<b>-</b>
		0.5		17057		17057	<b>-</b>	-	-	-
		1.0	<del>-</del>	_	2105	2105	•	-		<b>-</b> '
		1.5	<b>-</b> '	-		2103		102251	-	102251
		2.0	-	-	•		~	* =		<b></b>
		4.0	12289			12289		-	4000 11	-
	Mot - 1					12209		•		
	Total	• • •	13028	17913	2105 •	33046	_	100051		
		· · · · · · · · · · · · · · · · · · ·			Service of the servic	- SUCTO		102251		102251
0. Phormidium		Intertidal				*				
		0.0	<u> </u>	_		<b>**</b>	<b>-</b>	· ·	<b>~</b>	
		0.5	_	1 <u>-                                   </u>				1263	994	2257
-ul		1.0	en e			· •	-	•		
		1.5				•	<b>-</b>	-	-	
		2.0	www.				-	-		
		4.0					-	-		
		•			-		- **	•	****	- -
	Total	• • •			*		**	. ,		
Grand	Total	and the second s	4055.4					1263	994	2257
	10001	• • •	1079404	<u> 2471462</u>	<u>900226</u> 4	551092	371571			
	and the second	•	· · · · · · · · · · · · · · · · · · ·		=======================================		371571	4066985 1	<u>996711</u>	<u>6435267</u>

Total of all seaweeds (Total productive area 8415.8137 ha) = 17321940

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	and the tree and tree		3.	4.	5	6.	7.	8.	9.	10.	11.
1.	2.		AND NOTE AND NOTE AND	an extra length ready from the design areas with the	THE SECOND STATE OF THE STATE STATE STATE SAME STATE	THE STATE STATE CASE SEED STATE STATE STATE STATE STATE		64			64
A 1°	Torroilles		Intertidal	•	-		•••		_	. ==	-
45.	Leveillea		0.0	-	<b>-</b>		•	-	- 1 <u></u> 2 - 2	· •	
			0, 5	-	-	_				_	
			1.0	-	<b>-</b>	<b>-</b>					_
			1.5	-,		-	••• • · · · · · · · · · · · · · · · · ·	***	Ξ		
			2.0	s <del>au</del>	****	_	- / / · ·				
			4.0	_	<del>-</del> .			. <del>-</del>	<b>-</b> .	, . –	
				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				6.1			64
		Dotal	<b>.</b>	-		-	-	64			
		Oca.c						196			
									F.a.	•	
			•			<u> </u>			-		<del>س</del> ِ
46.	Polysiphonia		Intertidal			230	- 230	-		_ · _	
ŦO•			0.0			2.50	_			-	-
			0.5			<del>-</del>			_		-
			1.0	-	<b>-4</b>	-	• _	·		-	•••
			1.5	-	-		<u>.</u>	_		· .	
			2.0		•	-	-				·
			4.0	-	_		•••	-	·	• *	
		•	v. T				000	9	91	<u>.                                     </u>	-
		Total	·	-	- · · · ·	230	230			· · · ·	
		Total	• • •			-			* *		***
	•								***	•	<u>.</u>
			Intertidal		-	-,			-	•	· -
47	. Roschera glor	merulata	0.0	<b>.</b>	-	<b></b>	-	-	<b>-</b>		-
			0.5		8187		8187	-	-	<del>~</del>	***
			0.5		-	-	-	-	-		
			1.0	<del>-</del> .		<b>-</b> .	• •	. <del></del> .	-		<b>-</b>
			1.5	_	_			-		-	-
			2.0			-	<u></u>	_	-	V	•
			4.0	***							•
					8187	_	8187		-	•	-
	•	Total	• • •		0107			**			•
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			e Nergeria. Programme					•		with the second	. (
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	\$ 1 × 1 ×										
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Table - 2 Marine Algal Survey in I Sector 1971-72

Mainland & Islands between Thonithurai (Mandapam) and Kilakkarai and Mainland between Rameswaram and Athankarai wise

Species/estimated standing crop (tons fresh weight)

Groups		Species		I	Survey				II Surv		
Groups		<b>D</b> pcc1c3		Gulf of Mannar Mainland	Gulf of Mannar	Palk Bay	Total	Gulf of Mannar Mainland	Mannar	Palk Bay	Total,
1.		2.	an anganagan sangan garangan gan gan gan gan gan gan gan gan ga	3.	4.	5.	6.	7.	8.	9.	10.
Agarophytes	1.	<b>G</b> e¹idiella	acerosa	9.749	37.365	22.964	70.078	0.155	24.285	14.389	38.8 <b>29</b>
Agarophyces	1 5	Gracilaria		97.550	211.411	13.422	322.383	0.160	204.126	0.398	204.684
		Gracilaria		0.507	7.628	34.277	42.412	38.781	50.102	16.345	105.228
		Other Grac			197.818	9.745	348.053		118.997	7.834	126.831
		Hypnea sp.		25.653	321.071	21.628	368.352	9.287	406.994	25.464	441.745
			Total	273.949	775.293	102.036*	1151.278	48.383	804.504*	64.430	917.317
Alginophytes	1.	Sargassum	spp.	97.266	6400.043	855.604	7352.913	889.515	1361.624	120.137	2371.276
	2.	Turbinaria	spp.	180.399	204.688	245.032	630.119	27.487	176.305	304.472	508.264
		Padina sp.		7.448	274.269	3.228	284,945	98.491	121.192	33.404	253.087
		Hormophysa		• .					18.724		18 <b>.7</b> 24
		Cystoseira					•		33.673		33.673
			Total	285.113	6879.000	1103.864	8267.977	1015.493	1711.518	458.013	3185.024
Other seaweeds	. 1.	. Enteromorp	ha sop.	3.234	4.630	an garangan kangan kangan Kangan kangan kanga	7.864		37.938	2.882	40.820
Other Seaweeus	•	Ulva spp.		40.793	110.009	44.311	195.113		394.925	169.197	564.122
		Chaetomorp	oha son.	0.089	0.028	4.820	4.937	0.721			14.573
		Cladophora			14.529		14.529	6.994	4.755		11.749

1.		2.	3.	4.	,5. 	6.		7.:	8. 	9.	10.
Other Seaweeds	5.	Rhizoclonium			0.154	0.154					
		Bryopsis			6.350	6.350		•, •			· .
		Caulerpa sp.	67.364	524.295	185.967	777.626		6.412	604.687	82,939	694.03
	•	Codium spp.		115.868		115.868		. *1	80.503		80.50
		Halimeda gracilis	704.363	731.666	0.826	1436.855			2096.878	1524.303	3621 <b>.1</b> 8
	10.	Halimeda Macroloba	140.712	280.217	8.390	429.319		13.794	76.213	77.522	<b>167.</b> 52
	11.	Udotea Flabellum		143.425	140.768	284.193		36; 399			<b>36.3</b> 9
	12.	Microdictyon spp.			•			16.758			16.75
		Dictyosphaeria	•	2.598		2.598		1 21 × 1 ×	4	$\{ (x_1, x_2, \dots, x_n) \in \mathbb{N} \}$	•
		Valoniopsis	* . *	2.946		2.946		4.004	."		4.00
		Avrainvillea		9.029	in the second second	9.029					· · · · · · · · · · · · · · · · · · ·
		Dictyota	0.718	16.325	•	17.043		83.497	55.834	0.868	140.19
• •		Pocockiella variegata		8.052	62.518	70.570	3-	2.388	180.739		183.12
	18.	Stoechospermum marginatu	ım	5.244	1.383	6.627	•	9.237	4.090		13.32
	19.	Zonaria chimperi	1.891			1.891			66.538	$C_{i}^{*}(C_{i})$	66.53
•	20.	Zonaria crenata			63.061	63.061	• 1			• :	
-	21.	Spatoglossum asperum	• **	50.102	A SECTION OF THE SECT				1.684		1.68
	22.	Colpomenia sinuosa					Awar a	and the second of	39.679	اهار د افاط منظم این در راه	39.67
	23.	. Hydroclathrus calthratus	5						0.842	Harris Aller	0.84
	24.	Iyengaria stellata							2.525		2.54
		. Chnoospora fastigiata		en e					29.658		29.6
	26.	Galaxura oblongata				enter a service de la constant		en e	8.904	<b>W</b>	8.90
•		Gelidium			* ************************************			1.271		4.527	5.79
		Chondrococcus hornemani	i 0.887	1.365		2.252			9.683	36.577	46.26
		Amphiroa fragilissima	59.125	125.175		332.930		122.100	56.488	87.962	266.5!
		Amphiroa sp.		2.047		2.047		9.548	110.833		120.38
		- <del> </del>									

100 - Tana Angal A	2.		3.	4.	5.	6.	7.	8.	9 <b>.</b>	10.
then goattoods							•	•	en e	
ther seaweeds	31	Chielosporium spectab	ile	•			0.309		• • •	0.309
		Jania	Service Servic	51.771	197.859	249.630	19.139			19.139
		Grateloupia		6.263		6.263	0.515			0.515
		Halimenia	4.726	2.045		6.771		•		
		Gelidiopsis	The second secon		0.020	0.020	0.340		5.448	5.788
		Agardhiella		125.255		125.255				
		Champia		16.077		16.077	1.354	4.175		5.529
		Centroceras clavulatu	<b>m</b>	3.049		3.049	0.064			0.064
	- 4	Spyridia Spyridia	4.428			4.428		0.170		0.170
		Nitophyllum		÷	9.327	9.327		2.045		2.045
		Vanvoorstia spectabil	.e	4.094		4.094	e tig			
		Acanthophora	1.663	16.038	14.289	31.990	30.646	75.159	0.199	106.004
		Chondria	35.862			35.862		•		
		Laurencia	0.521	73.220	9.218	82.959	5.093	4.674	3.293	13.060
		Leveillea					0.064			0.064
		Polysiphonia		,	0.230	0.230				
	100	Roschera glomerulata		8.187		8.187				
		Other filmentous red	$(x_i, x_i) \in \mathcal{X}_{i+1} \times \mathcal{X}_{i+1}$				0.923			0.923
		Lyngbya	13.028	17.913	2.105	33.046		102.251		102.251
		Phormidium						1.263	0.994	2.257
	J. O.	Total	1079.404*	2471.462	900.226	4451.092	371.571	4066.985*	1996.711	6435.267
		Grand Total	1638.466	10125.755	2106.126	13870.347	1435.447	6583.007	2519.154	10537.608

<sup>\*</sup> In giving groupwise estimates for the I Sector only these quantities were included based on their abundance among both the surveys.

Marine Algal Survey in the I Sector 1971-72

Mainland and Islands between Thonithurai (Mandapam) & Kilakkarai & Mainland between

Rameshwaram and Athankarai Groupwise Estimated Standing Crop (tons fresh weight) & their percentage Total of all sea-Alginophytes weeds Agarophytes % Standing Productive % Standing Mainland and Islands Standing Crop Standing Crop Area Crop Crop Hectares Gulf of Mannar 2368.846 11.564 1015.493 42.869 1079.404 45.566 273,949 1713.3500 111502489 6879.000 58.542 4066.985 34.611 Main land 6.846 804.504 4356,2737 Islands 3202.605 1103.864 34.467 1996.711 62.346 3.186 102.030 2346.1900 Palk Bay 1180.483 6.815 8998.357 51.948 7143.100 41.237 17321.940 8415.8137 TOTAL

Marine Algal Survey in the II Sector 1972-73

Mainland between Kilakkarai and Kukkaiyur

Depthwise Estimated standing Crop (kg fresh weight)

Sr.	Species	Depth	Un <b>Ar</b> ea		tinuous density/		tion ng Crop	Unde Area	er discrete dist Mean density			standing
			Sq.m.	g/m <sup>2</sup> & rd err	standa-	Lower	Upper limit	sq. m.	g/m <sup>2</sup>	crop	Lower limit	
1	2	3 .	4	x = 5		66	7	· 8 · ·	9	10	11	12
AGAROPI				y the same that seem is a	the first transfer of the second	e e	***					11.50
1. Gel:	idiella acerosa	0.5	grap finds		e e e e e e e e e e e e e e e e e e e			1450	30.01	43	43	43
		1.0						1900	6,66	127	127	127
	17 - 1 - 3	1.5	17700	95	28	1185 1185	2177				1185	2177
	Total	-				1185	2177			170	1355	2347
2. Grac:	llaria corticata					*		1400	10	14	14	14
<u> </u>		tidal					,		3	1		1
		0.0	<b>1</b> 600	.907	319	940	1961		40.00		941	1961
		0.5	<del>نه می</del> و س			* * ***		1900	13.33	25	25	25
		1.5 2.0						10200 15050	16.66	170 25	170 25	170
	Total	2.0				940	1961	13030	1.00	220	1174	25 2195
3.GRAC		0.0			will pile		1701	1600	26.66	27	27	2195
5, <u>c.a.o.</u>		0.5		-			***	1450	1.66	3	3	3
		1.5	10200	85	30	561	1173		<b></b>	The same area	561	1173
		2.0						15050	5.0	75	<b>7</b> 5	75
	Total					561	1173			105	.666	1278
4. HYPNI	EA MUSCIFORMIS	0.0			*****			160ე	6.66	11	11	11
<u> </u>		4.0	<b></b>					74700	23.33	1743	1743	1743
F 0 11	Total	0.0	1600	50		80	80	<del></del>		1754	1754	1754
5. Ge 110	diopsis respens	0.0	1600	50		ייס	80	<b></b>		*** ***	80	80
	GRAND TOTAL				*****	Transfer to the manager					5029	7654

_	,
*	,

1	2	, 400 and 400 gap ( <sub>200</sub> and 400 and 4	3	4		)	6	7	8		9	10	11	12
<u> </u>	LGINOPHYTES								. <del></del>					
1	Sargassum	ilicifolium	2.0	5300	175	17	837	1017					837	1017-
2	. Sarqassum phyllum	plagio-	Inter- tidal		en e				1400	*	6.66	9	9	9
			0.0 1.0 1.5	1600 14700 7500	72. 142	_	8 573 507	8 1578 1630					8 573 50 <b>7</b>	1578 1630
_		Total		7550	176	7	1088	3216					1097	3225
3	. Sargassum	wightii	0.0 0.5 1.5	16800 21250 11550	100 1260 42	54.4 870 20.8	756 <b>816</b> 0 245	2563 45390 725					756 8160 245	2563 45390 725
_		Total		erese ja sa A			9161	48678			<del></del>		9161	48678
4	. Turbinari	a conoides	0.5 1.5				~		19800 200		701.00 86.66	13860 17	13860 17	13860 17
-		Total										13877	13877	13877
5	• <u>Turbinari</u>	la ornata	1.0 1.5	7500	32.	5 8.6	179	308	14700		70.0	1029 	1029 179	1029 308
		Total					<b>17</b> 9	308					1208	1337
<del>1</del>	Grand T	otal											26180	68134
	ages and grip with this days care who have two the													

						در دو سے جو دی ہے ہیں د	·						
1	2	,	3	4	, 5		6	7	8	9	10	11	12
OTHER SEAV	veeds			100 da ale ale 104 ale	·			and any other paper which charts are the chart to the					•
1. Enteromo	orpha compr	essa	Inter- tidal	1400	150		210	210	•			210	210
2. Caulerpa	cupressoi	des	4.0						74700	37.0	2241	2241	2241
3 Caulerna	a <u>scalpelli</u>	formi	s-Q.5		er e	· ·,, <del></del>		<b></b> `.	1450	96.66	140	140	140
4.Caulerpa	The second server is an ex-	***	1.0				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		7500	78.33	588	588	588
		99 u	1.5			Land Market			24600	33.33 -	820	820	820
	Total	garate is payedon . • . All displacement	2.0						228400	10.00	2284 3244	2284 3244	228 <u>4</u> 3244
5 Caulero	a taxifolia		1.0					-	14700	11.66	171	171	171•
6. <u>Udotea</u>	<u>flabellum</u> ctyon tenui		4.9 1.5 2.0	3500 77300	165 100	81 64	294 2782	861 12677	607	13.33	 	8 294 2782	8 861 12677
	Total						3076	13538				3076	13538
8.Valonio	psis pachyn	ema	0.5						1450	166.6	242	242	242
	laria furci		Inter=	1400	40		56	56	<b></b>			56	56
0. Dictyo	ta dichotom	<u>a</u>	0.0	1600	10,		16	16		e e e e e e e e e e e e e e e e e e e		16	16
1. Padina	gymnospora		0.0			and the second			15000	16.66	250	250	250
2. Pocock	iella <u>varie</u>	gata	1.5 2.0	13700 15050	35 93.3	10.6 30.5	334 945	624 1863	<u></u> ,			<b>334</b> 945	624 1863
	Total		. —				1279	2487				1279	2487

)-o-o-o-o-o-o-o-o-o-o-	0-0-0-0-0-0-	0-0-0-0-0-0	· 0=0=0=0=	-0-0-0-0	-0-0-0-	0-0-0-0	-0-0-0-0-0	0-0-0-0-0	-0-0-0-0-	0-0 0-0-	49
-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0	1.0	14 <b>7</b> 00	32.5	-0-0-0-0-0 1.75	-0-8- <sub>0</sub> 452	0-0-0-0-n	-0-0 <del>-</del> 0-0-0	D0-0-0-0	-0-0-0-18-	0-0-0-11	0-0-12
	1.5	<b>75</b> 00	90	42.4	357	503 993		PR 900	· · · · · · · · · · · · · · · · · · ·	452	50
	2.0	5300	60	28.2	168	993 467	ete au			357	99:
Total			, s		977			The state of the s		168	46
Amphiroa fragilissi	ma 1.5	350 <b>9</b>	130	O.F.		1963				977	1963
	2.0	77300	305	85 183	157 9430	752	Will date		Aller was	157	752
Total			e en	and a summer of contracting to the	man and a second	37722	and the state of t	Service of the servic	1	9430	37722
Jania adhaerens	0.0	Market Co.	Paris collision (School and Administrative)	ere and seemed a net assessed	9587	38474	يواريني همسا حادده			9587	38474
The second secon		1600	16.5	1.5	24	29	· · · · · · · · · · · · · · · · · · ·	in in the second	-	24	29
<u>Chondrococcus horne</u> manii	_ 2:0						15050	<b>5.</b> )83	50	50	
Champia parvula	0.0	w ==						•	30.	50	50
Centroceras Clavulatum	0.0						1600	3.3	5	5	5
Ceramium sp.	2.0 1.5	•	<b></b>	****	ente para		77301	33,33	2576	2576	2576
							3500	106.00		373	2576 <b>3</b> 73
Grand Total					est established and the second	The state of the s	P Tangari , gangan <mark>digigarkan</mark> an <del>indan tagan</del> an (1864-1914), inga tangkang S	Andrews and history and an experience of	Herrical Company of the second property and the second party.		J/J

#### Table - 5

## Marine Algal Survey in the II Sector 1972-73 Upputhanni Island

Sr.	y tao and the tree too too too too too too too too too t	Depthwise	Estima Under	ted Standing C continuous di	stribut:		Under	<u>discrete</u>		Total s	The state of the s
No.	Species	Depth	Area sq.m.	Mean density g/m <sup>2</sup> and standard	Standir Lower Limit	ng Crop Upper Limit	distri Area sq.m.	Mean density	Standing Crop	Lower Limit	Upper Limit
1.	2.	3.	4.	error x+ se	6.	7.	8.	$(g/m^2)_{9}$	10.	11.	12.
Agai	cophytes	garan arang arang kanggapan arang aran Sanggaran arang aran			e de la composición dela composición de la composición dela composición de la compos	• • • •	•	7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -			- <del> </del>
1.	Gracilaria corticata	1.0			<del></del>	·	70342	26.66	1876	1876	1876
2.	Gracilaria foliifera	1.0		•	. ••	<u> </u>	70342	1.66	117	117	117
	Grand Total		• .	en e			1.1			1993	1993
Ala:	inophytes			10 miles	4=		•				
1.	Cystoseira trinodes	1.0	-		-	<del></del>	70342	6.66	469	469	469
2.	Sargassum tenerrimum	1.5	-	-		-	70342	166.6	11780	11780	11780
3.	Sargassum wightii	1.0		i L	-		70342	10.00	703	703	703
	Grand Total				di d	HA		• • • • • • • • • • • • • • • • • • •		11892	11892
Oth	er Seawe <b>eds</b>	•	z1		; ·					1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ا با الله الله الله الله الله الله الله
1.	Codium tomantosum	1.0	· • · · ·	- · · · · · · · · · · · · · · · · · · ·	• •	•	70342	33.3	2345	2345	2345
2.	Dictyota dichotaoma	1.0		) <del>-</del>	. ( <del></del>		70342	3.33	586	586	586
3.	Padina gymnospora	1.0		. •		-	70342	10.0	351	351	351
		1.5	, , <del></del>		, <del>-</del>		70342	16.6	1172	1172	1172
	Total								1523	1523	1523

1.	2.	3.	4.	5.		6.	7.	8.	9.	10.	11.	12.
4.	Padina pavonica	1.0		<b>-</b>		· _	444	70342	6.66	468	468	468
5.	Pocockiella variegata	1.0	-	<b>-</b>		•	<b>-</b> ·	70342	16.6	1172	1172	1172
6.	Stoechospermum marginatum	0.5	<b>-</b> ,			-		15562	50.0	778	778	778
		1.0	70342	90	7	5838	6823		-	<b>-</b>	5838	6823
	Total								_	778	6616	7601
7.	Copomenia sinuosa	0.5	-	-	-	÷ .>	<b>÷</b> 7/2 :	<b>1</b> 5562	5.0	78	- 78	<b>7</b> 8
		1.0	70342	22.5	2	1442	1724			•	1442	1724
	Total	•								<u>78</u> .	1520	1802
8.	Hydroclathrus clathratus	0.5	-	-		•	_	15562	8.33	130	130	130
9.	Laurencia paniculata	2.0	-	-	_	<b>-</b> .	·	70342	1.66	74	74	74
	Grand Total					4.					14434	15701
		Total of	all sea	weeds .	(Tota	il produc	tive ar	ea 20 20.	04 <b>4</b> 5 sq.m 0445 ha.	.)	29319	30586

#### Table -6

## Marine Algal Survey in the II Sector 1972-73 Suli Island

Depthwise Estimated Standing Crop (Kg. fresh weight)

Sr.	Species	***************************************	Depth	Under o	continuo	us dis	tributio	n Chan	Under	discrete discrete discrete discrete	distri-	Total st	
~ - '				Area sq.m.	Mean_de (g/m²) standar error x	and d	Standin Lower Limit	Upper Limit	Area sq.m.	Mean density (g/m <sup>2</sup> )	Standing Crop	Lower Limit	Upper Limit
1.	2.		3.	4.	5		6.	7.	8 ,	9.	10.	11.	12.
 Agar	cophytes												a A
1.	Gelidiella ace	rosa	0.5	<b>-</b>	-	**		· · · · · · · · · · · · · · · · · · ·	26662	1.66	44	44	44
,			1.0	-	-		<b>-</b>		20 <b>587</b>	20.00	412	412	. 412
	To	tal									456	456	456
,		14	0.5	_	<b></b>			•	26662	66.66	1777	1777	1777
2.	Gracilaria edu		0.5	_				-	26662	6.66	178	<b>17</b> 8	178
3.	Gracilaria fol								26662	16,66	443	443	443
4.	Hypnea valenti	ae	0.5	<u> </u>					20587	63.3	1304	1304	1304
•			1.0 1.5		_		_	•••	5787	6.66	38	38	38
	_		1.0	-	. <del></del>	•	900			•		1785	1785
•		tal	ī	B	• •			•••		• 1,	•	4196	4196
	Gr	and Total						• •	* 1		·		
Ala	inophytes		• .										
1.	Sargassum wigh	tii	0.5	26662	352.5	102	6679	9398	-		-	6679	· 9398
•			1.0	-	-		-	-	20587	133.3	2745	2745	2745
			1.5	5 <b>7</b> 37	210	135	430	1479		<b></b>	•	430	1479
•			2.0	15525		210	1436	7956	-	• · · · · · · · · · · · · · · · · · · ·	-	1436	7956
. **	TC	otal					· · · · · · · · · · · · · · · · · · ·		#			11290	21578

1.	2.	3.	4.	5.		<del></del>						53 1
Othe	r seaweeds					6.	7.	8	9.	10.	11.	12.
1.	Ulva reticulata	0.5			1000							
		1.0		_				26662	16.66	444	444	444
		1.5	-	_	. <b></b>		~	2058 <b>7</b>	133.33	2745	2745	2745
	Total		•	<del></del>	<b>~</b>		. •••	5737	40.00	229	229	229
2.	Caulerpa racemosa	1.0		_							3418	3418
3.	Caulerpa sertularioides	1.0	_	_			-	5737	66.66	1732	1732	1732
4.	Dictyota dichotoma	2.0	_	_		-	-	5737	3.33	69	69	69
5.	Padina gymnospora	0.5	_				<b>-</b>	15525	16.66	289	289	289
		1.0	2058 <b>7</b>	100	36 3		′ <b>-</b>	26662	66 <b>.</b> 66	1777	1777	1777
. 1		2.0	20307		<b>36</b> •3	1537	2785		-	_	1537	2785
	Total				-	~	-	15525	66.66	1035	1035	1035
6.	Padina tetrasnomatica	0.0					x = x - x	* + <sub>2</sub> x		•	4349	5597
	Ood I I I I I I I I I I I I I I I I I I I	0.5	-		-	•	-	8437	1.66	14	14	14
		1.5	•	<b>₹</b>	••••••••••••••••••••••••••••••••••••••	-	. 🖚	26662	100	2666	2666	2666
	Total	T• 3				_	<del>-</del>	5737	33.33	191	191	191
7.	•	_			* <del>**</del> ** **					· · · · · · · · · · · · · · · · · · ·	2871	2871
	Pocockiella variegata	0.5 1.0 1.5	- -			•	- -	26662 20587 5737	13.33 26.66	355 549	355 549	355 549
	Tota1	•				t m <del>e</del> s e e e e e e e	• • • • • • • • • • • • • • • • • • •		33.33	191	191	191
	Grand Total									1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1095 13433	1095 14681

Total of all seaweeds (Total productive area 76980 sq.m.)
7.695 ha.

## Marine Algal Survey in the II Sector 1972-73 Nallathanni Island

The Charles	Depthwise Depth		continu	ous dis	tributio	n	Under	discrete d	istri-	Total st	
Sr. Species	Верен	Area sq.m.	Mean <sub>2</sub> d (g/m²) standa	lensity and	Standin Lower limit	g Crop Upper limit	Area sq.m.	bution Mean density (g/m <sup>2</sup> )	Stand- ing Crop	cro Lower Limit	Upper Limit
1. 2.	3.	4.	5.	A T DC	6.	7.	8.	9.	10.	11.	12.
Agarophytes						ega e					
•	o É			_	· ·		35175	6.66	234	234	234
Gelidiella acerosa	0.5	•••	<b>-</b>	_	_	PAS	35175	5	176	176	176
Gracilaria corticata	0.5		<b>-</b>			· ·	35175	6.66	234	234	234
Gracilaria edulis	0.5	-				Fa <b>nt</b>	22612	30.0	678	. 678	678
Hypnea musciformis	0.0	. <u>-</u>	_	_	·		575362	6.66	3831	3831	383
	1.0 2.0	<del>-</del> 3979800	40	11.5	113424	204959			•••	113424	204959
mat a l	2.0	3919000								117933	209468
Total	W										
5. Hypnea valentiae	0.5		-	-	-		35175	50.00	1759	1759	1759
Grand Total	<i>2</i> 1							•		120336	<u>21187</u>
Grand Total	•			- m							,
	<i>E</i> 1			•			·		•		
Alginiphytes						_ *:	22612	3.33	75	75	7:
1. Sargassum plagiophyllu			400	- ;	9426	25044	22012	_ `		9426	2504
<ol> <li>Sargassum wightii</li> </ol>	0.5	35175	490	212	9420		575362	100	57536	57536	5753
	1.0	u a sa s			· <del></del>		5,5502		, = . = -		
Total	- 100 mg	an a san			and the second second			The second second	e agreement of the second of the second	60962	8258
Grand Tota	•									67037	<u>8265</u>

_	_
Ь.	۲

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Othe	er Seaweeds						-	-			•
1.	Padina gymnospora	0.5	-	<b>-</b> ,	-	<u> </u>	35175	16.66	586	586	586
2.	Padina pavonica	0.0				-	22612	23.33	528	528	528
3.	Colpomenia sinuousa	0.0	. <b>.</b>	_ / 1/3/ _ fix	- wai	<b></b> ₁ : .	22612	10.0	226	226	226
	Grand Total		4 + - 1 			. 101			. •	1340	1340

Total of all seaweeds (Total productive area ... 4612949 sq.m.)
461.2949 ha.

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the distribution of the

## Marine Algal Survey in the II Sector 1972-73 Yanaipparai Island

#### Depthwise Estimated standing crop (kg. fresh weight)

Sr.	Species	Depth	Under	continuous	distri	bution		Under	discret	e dis	stribution	Total	standing
No.	•		Arear Sq.m.		ty rđ		ng crop Upper limit	Area					
1	* <u></u>	3	4	<b>x</b> - 5		6	7	8	9		10		12
AGAR	OPHYTES												
	elidiella acerosa	Interdial 0.5						1800 72030	33.33 23.33		60 1680	60 1680	60 1680
	Total		The state of the s			Tars sometimes are the control of th		entrale de la companya del companya del companya de la companya de	and the state of t		e ees ye oo	1740	1740
2. <u>G</u>	racilaria crassa	Intertidal				-		1800	333,33	. 4.	581	581	581
		Intertidal	<b></b>	هند ه			-	1800	. 50		90 👾	<b>90</b> 999	91
	All the state of t	0.0		· · · · · · · · · · · · · · · · · · ·				43365	10		434	434	434
	Total	name service visite, a conserve or collection depression remove to a	un inggesterne en son nord i en j	TO SERVICE STATE OF THE SERVIC		AND HE SHARES ATTEMPT OF SHARES OF	es an estado dos especialistas de la compansión de la compansión de la compansión de la compansión de la compa	Min in a selfe halogan yan <b>ani</b> an a <u>hadda kenda</u> -		distinct of the same		524	524
3. <u>H</u>	ypnea valentiae	Intertidal 0.0	1800	45	10.7	62	100	43365	20		 867	62 : 867	100 867
	Total	and the second s		The second secon					The Control of the Co	AMERICAN CONTRACTOR OF THE		929	967
	Grand Total		a construction			And the second desired the second sec		ned	ا الله الله الله الله الله الله الله ال	gan a see a se	er en en entangen general en	3774	3812
	NOPHYTES argassum wightii	0.5 1.0	- <u>-</u> 49245	107.5	46.2	 3081	<b></b> 7569	72030	16.66	• •	1201	1201 3081	1271 7569
2. <u>T</u>	urbinaria ornata	0.0 0.5 1.0	 				age 640 660 ton gas 660	43365 72030 49245	93.33 40.01 26.66		4047 2881 1313	4047 2881 1313	4047 2881 1313
	Total					agaran da Algabar (Algabar) (Algabar		-			Andrew Communication of the Co	8241	8241
	Grand Total										And the second s	12523	17011

· a may take the play and the time that the time the time the time that the fine time the time the time the time the time time the time time the time time time the time time time time time time time tim	عه ويو دي دي چه اندا اندا کيا کيا											57	
2 2 44 47	3	4	· · · · · · · · · · · · · · · · · · ·	5		6	7	8	9	10	11	13-312	
THER SEAWEEDS	e emilione per per per per per per per per per pe					1 ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (							
. Ulva reticulata	Interti	dal	• •		•	MARINER OF THE STREET	·	1800	63.33	60	60	60	
	0.5	S arms arms			****			72030	40.00	2881	2881	2881	
	1.0		The second	~~		· -	-	4924	10.00	492	492	492	4
Total		-madeine state of the companies of the c	<del>der i ste</del> re i de l'entre proprie de la company			anni e e e <del>delegan</del> je i meja i asasi.	All I de la companya	interest annihous se e e e e e e e e e e e e e e e e e		A CONTRACTOR OF THE PROPERTY O	3433	water the contract of the cont	
. Caulerpa racemosa	0.0	min una			commence a surge of Manager			43365	6.66	289	3433 289	3433	.,
. Codium tomantosum	0.5			1.49 445		· :		72030	36.66	2641	2641	289 2641	•
. <u>Halimeda gracilis</u>	0.0	43365		100	36.3	3239	5867				3239	5867	
	0.5	errore — — — — — — — — — — — — — — — — — — —	*	-			days faith	72030	43, 33	3121	3121	3121	**
	1.0			1-0 400				49245	66.66	8206	8206	- 8296 8296	: ' •
Total		and the first of t				the state of the s	the contribution is a series of a consequence	tor commence contribute destinating accordance or commence .	- Marilla American		14566	17194	
. Udotea flabellum	2.0							38387	16.66	643	643	1 643	V. · Autom
. Colpomenia sinuosa	Intertion	dal					· ·	1800	60	108	108	198	•.
Hydroclathrus clathratus	Intertio	dal						1800			<b>7</b> 8	\$ 50 <b>3</b> W	4
Dictyota dichotoma	0.5							* .	43.33	78	78	78 44.	:
								72000	10	721	727	720	
Padina pavonica	Intertion 0.0	ial		-				1800	60	108	178	108	
Total	U.U			aland 1989 Marie Park and Andrews	ر دیو اورون در اورون	enter appare	The state of the s	43365	20	867	867	867	
TOCAL	-										975	975	

	2	3	4		5		6	7	8	9	10	11	12
0. <u>P</u>	adina tetra- romatica	0.0	ما ۱۸۰۵ به استهامه به به د مهههد بین استهام استهام به استهام بین	na ngawan ing properties Angaba	CO. On control control of control	Carrier Control of	LIAS (FOR SALE) 14		43365	66.66	2891	2891	2891
1. ]	Pocockiella Variegata	0.5	AND THE			• .		·	72030	23.33	1680	1680	1680 2245
	Total	1.0	49245	ر بر پو	35	10.5	1201	2245	Company Colors  Color Co	and the second s		1201 2 <b>8</b> 81	3925
2.	Stoechospermum		er in rungen <del>der rechter</del> er i <b>der</b> er	ya wan amin'ar	in water first war in other there	and the second s	a sua transportuente en esta en esta en esta en en esta en		1800	20	36	36	36
<u>.</u>	marginatum	Intertical 0.0	-100 1906 . 						43365	30	1301	1301	1301
	Total	gant a la transferencia de la compania compania de la compania de la compania de la compania de la compania de	ta estado de estado estado Estado estado estad	e and a suppose of the	· · · · · · · · · · · · · · · · · · ·		*****		eringan (a.a.) a eringgan pangahangkangkang pangahangkang saban sabin sabin sabin sabin sabin sabin sabin sabi	ur sakityaptakan e t dar minutus digutikus diputikus kerus asalam midder		1337	1337
	Chnoospora	1.0	e e e e e e e e e e e e e e e e e e e	and and the second sec	man dem	and the second section of the	Constitution of the Consti	of garagina, white selection is	49245	6.66	228	228	228
1.	implexa Centroceras clavulatum	Intertidal							1800	1.66	3	3	3
5.	Acanthophora spicifera	Intertidal	ren eus :		abid one		*** am		1800	13.33	23	23	23
* :	Total	i un saka kalan kulan kalen ese ese ese ese ese ese ese ese ese e		and the second section of the second sections of the section section sections of the second section sections of the section section sections of the section section section sections of the section section section sections of the section sect		k - programa (Spiritorium validatus Hannalli -	and the second s		anga i makanasa <b>da</b> nga kanga i ingga kanga ang sanga			30816	<b>34</b> 488
	rand Total	kassinis perindentingan saker sakerakan kemilikan sakera sakeban (1 km km km saker 3 S	t comme de la residio de l'implementamentament									47113	55311

204027 sq.m.) 20.4027 ha

#### Marine Algal Survey in the II Sector 1972-73

#### Palayamunai Island

Depthwise	mat impted	ctanding	Cron	(Ka	frech	waight)
Deptnwise	BSCIMACEC	Scanding	CLOD	(1/4)	TTCOLL	WCIGITO
	the same about the court was a second to the same and the same about the same abo	THE OWNER OF THE PERSON NAMED IN		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		

Sr.	के तक पाठ गांव पाठ गांव ताव वांचे ताव वंद्र का पाठ गांव गांव वंद्र वंद्र गांव वंद्र वंद्र गांव वंद्र वंद्र गांव वंद्र	and the state of t	Under Area	continuous dis Mean density	tribution	Crop		iscrete d	is-	Total s Cro	tanding
No.	Species	Depth	sd•w•	(g/m²) and standard error x + se	Lower Limit	Upper Limit	Area sq.m.	Mean density (g/m²)	Standing Crop	Contract of the Contract of th	Upper Limit
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Agai	rophytes										
1.	Gracilaria crassa	0.5	-	-	- * · · · · · · · · · · · · · · · · · ·	<b>-</b>	7700	16.66	128	128	128
2.	Gracilaria edulis	0.5	<b>*</b>	· ·	-	-	<b>77</b> 00	100.00	770	770	770
	Grand Total									898	898
				•							•
Alg:	inophytes										•
1.	Sargassum ilicifolium	1.0			<b>-</b>	****	27775	6.66	185	185	185
	Total									185	185
Oth	er Seaweeds								a .		
1.	Codium tomantosm	1.0	-		•	-	27775	66.66	1882	1882	1882
2.	Halimeda gracilis	0.5		<b>-</b>	_	-	7700		411	411	411
		1.0	`			-	2775		5555	5555	5555
	Total				1.4		`*		reserv	5966	5966
3.	Udotea flabellum	2.0	_	· · · · · · · · · · · · · · · · · · ·	-	. ***	25700	11.66	2887	2887	2887
4.	Dictyota dichotoma	0.5	· <del>=</del>	- 1. ·	*	-	7700	30.00	<b>3</b> 31 💐	231	231
5.	Padina tetrastromatica	1.0	•••		***************************************	-	27775	5.0	139	139	139
	Conditional Conditions (Conditional Conditional Condit	2.0	-		-		247500	18.33	4537	4537	4537
	Total								•	4647	4647

100 Gad ring 10										÷				61
1.	2.	3.		4.	5		6.		7.	8.	9.	10.	. 1311.	12.
6. 7.	Pocockiella variegata Amphiroa fragilissima	2. 1.	0	 ,	<b>.</b>	- -			•	25700 27775	16.66 11.66	4125 324	4125 324	4125 324
i "Tar"		1.	5	1595	00 15	5 28	202	256	<b>291</b> 88	3 -			20256	<b>291</b> 88
or LL or • • Eghti	Total						·	•					20580	29512
8.	Laurencia papillosa	0.		-	<b>~</b>				_	7700	30.00	231	231	231
9.	Lyngbya majuscula	1.	5	•			-		-	<b>15</b> 9500	33.33	5317	5317	5317
	Total									. A way of			45865	54797
						· · · · · · · · · · · · · · · · · · ·					•		Tasi	n symmetric street, sometric street, som
		Tot	al of	all se	aweeds	• • • •	(Total	produc	ctive	a <b>rea</b>	44.247		46948	55880
								in the second se					e e e e e e e e e e e e e e e e e e e	
		n er vælj											TIME TOMOR VANCA MELTINE	

TO THE

### Marine Algal Survey in the II Sector 1972-73 Nandamukhi Island

Depthwise Estimated Standing Crop (Kg. fresh weight)

Sr.	Species	Depth	Under Area	Mean o	uous dis density	tributi Scand	on ing Crop		discrete d		Total Stai	nding
-			sq.m.	(g/m²) standa error		Lower Limit	Upper Limit	Area sq.m.	Mean density (g/m²)	Standing Crop	Lower Limit	Upper Limit
1.	Ann de principal de la companya del companya de la companya de la companya del companya de la companya del la companya de la c	3,	4.		5.	6.	7.	8.	9.	10.	11.	12.
Agar	ophytes				· · · ·				Care Considered Charles (State States	And the second second	The state of the s	- the first the trees the party that I had
1.	Gelidiella acerosa	2,•0 m			-			825	26.66	22	22	22
2.	Gracilaria sp.	0.5	_	-	-	-	•••	<b>135</b> 0	28.33	38	38	38
3.	Hypnea pannosa	Intertida	1-		-	• •	· · · · · · · · · · · · · · · · · · ·	9225	35.00	323	323	323
	to the second of	0.0	825	55	35.3	16	74	•	_	•	16	74
		1.5	<b>-</b> ,	<b>-</b>	-	-	•	450	18.33	8	8	, <del>1</del> 8
		2.0	66	<b>-</b>	-	. <del>.</del>	•	1500	5.0	7	7	7
	Total		House Sales								<u>31</u>	୍ତ ୍ର <b>୧</b> ୨
•	Grand Total		•	•		*			and the second second		414	472
Algi	nophytes											Control of the Asset Ass
1.	Sargassum wightii	Intertidal	_	_		_	way .	9225	28.33	261	261	064
		0.0	825	47	28.2	15	62		_	201		261
		0.5	1350	117	58.3	<b>7</b> 9	237	-	. <u>_</u>		15 70	62
	***	1.0	-					750	10.00	-	79	237
		1.5			 . <del></del>	•	•	450	100.00	45	7 45	7
	Total	en e			1.4 24.						45 407	612

		1.	2.										4 ()	<b>~ →</b> taker
			∠ φ · · · · · · · · · · · · · · · · · · ·	3.	4.		,,	6.	7.	8.	9 •	10.	11. 39	12.
		2.	Turbinaria ornata	Intertidal	9225	135	40	876	1614	•	* -		876	1614
* · •		•		0.0	<b>-</b> .		;; <b>-</b>	-	-	825	63523	52	52	52
•.				0.5		-		-	-	1350	66.66	90	90	90
				1.0	•	-	-	<b>-</b> ,	-	750	50.00	37	37	37
			Total	and the second s	•			* *		*			1055	1793
	•		Grand Total						1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				1462	
		Othe	r Seaweeds						• 1.		*	\$5	the second second second	2405
		1.	Ulva reticulata	Intertidal		-	-	· ·	(	9225	18.33	169	169	160
				0.0		• • · · · · · · · · · · · · · · · · · ·	-	· ·		.825	18.33	15	15	169 15
. %	* * * * · .	~	Total		1 · · · · · · · · · · · · · · · · · · ·							erica er Erica erica eri	184	184
		2.	Caulerpa racemosa	0.5 1.0	1350 <b>7</b> 50	205 92.5	35.7	229	325	agy <b>∓</b> a	-	-	229	325
; 8	******			1.5	-/50	92.5	27 -	49,4	90	<b>-</b> 450	<del>-</del> 96.33	<b>-</b> 43	49	90
4-14-5.		· .	Total		• •	• •						43	43	43
,	•	3.	Caulerpa scalpelliformi	s 0.5		-	1.1 1.1 •••	_		1350	25.3	2.4	321	458
• •			Total	1.0		÷g to the second of the seco			·. 🛓 🔐	750	233.3	34 175	34 175	34 <b>17</b> 5
		4.	Padina tetrastromatica	Intertidal .	9225	42.5	8.8	311	473	in en			209	209
				0.0	_	_				825	18 <sub>•</sub> 33	- ·-	311 15	473 15
in V			Total	• •									326	488 -
to a survey	• "	5.	Zonaria variegata	2.0			_	_	17). 18.	1500	31.66	47	47	47
•		6.	Chondrococcus hornemani	<u>i</u> 2.0	- 7.77			-	e de la companya de l	1500	6.66	10	10	10
						en de la companya de		•					10	10
Ser.			Grand Total				erra e e e como de la						1097	1396
	•			*** ***				• •				en e		
			Total of al	l seaweede	( m	otal ~~								
			rood or dr	l seaweeds	•••• (1	ocar br	oauctiv	re area .	1410	)O sq.m.)			2973	4273

.

# Marine Algal Survey in the II Sector 1972-73 Mainland between Kilakkarai & Mukkaiyur Specieswise Estimated standing Crop (tons fresh weight)

	Spec		Standing Cron				
Group	Spec	:Tep	Lower	Upper Limit			
		- 1000 COD	Limit	THIT TO THE PARTY OF			
Agarophytes	1.	Gelidiella acerosa	1.355	2.347			
AGG1 Sp., 1	2.	Gelidiopsis repens	0.080	0.080			
	3.	Gracilaria corticata	1.174	2.195			
	4.	Gracilaria debilis	0.666	1.278			
	5.	Hypnea musciformis	1.754	1.754			
		Total	5.029	7.654			
	•	Sargassum ilicifolium	0.837	1.017			
Alginophytes	1.	Sargassum flagiophyllu	m 1.097	3.225			
	2•	Sargassum wightii	9.161	48 <b>.</b> 67ମ			
	3.	Turbinaria conoides	13.877	13.877			
	4,	Turbinaria ornata	1.208	1.33			
	5.			68.13.			
		Total	26.180	00.13			
aller decreade	1.	Enteromorpha compress	a 0.250	0.259			
Other Seaweeds	2.	Caulerpa cupressiodes	2.241	2.241			
	3.	Caulerpa peltata	0.588	0.588			
	4.	Caulerpa scalpelli- formis	3.244	3.244			
	5.	Caulerpa taxifolia	0.171	0.171			
	6.	Udotea flabellum	0.008	0.008			
	7.	Microdictyon tenuis	3.076	13.538			
	8.	Valoniopsis pachynema	0.242	0.242			
•	9.	Sphacelarea turcesera	2 256	0.056			
	10.	Dicyota dichotoma	0.016	0.016			
	11.	Padina gymnospora	0.250	0.250			
	12.	Pocockiella variegata	1.279	2.487			
	13.	Zonaria creneta	0.977	1.963			
	14.	Chondrococcus horne-	0.050	0.050			
		manii	0.050	0.030			
	15.		0.024	38.474			
	16.	Amphiroa fragilissima		0.005			
	17.		0.005				
-	18.			2.576 0.370			
	19.	Ceramium sp. (Rhodoph	yta)0.373				
		Total	24.973	66.521			
		Grand Total	<u>56.182</u>	142.30			
			•				

## Marine Algal Survey in the II Sector 1972-73 Islands between Kilakkarai & Mukkaiyur

Specieswise Estimated Standing Crop (tons fresh weight)

	Sr. Spec <b>ies</b> No.	Upputh Island		Sulii Island Standing crop		Nallathanni Island Standing crop		Yanaipar Island Standing crop		Palliamunai Island Standing crop		Nandamukhi Island		Total Standing crop	
	1 2	Lower limit	Upper limit 4	Lower 1 limit 5	Upper limit 6	Lower limit 7	Upper limit 8	Lower limit 9	Upper limit	Lower limit	-Upper limit	limit :	Upper limit	Lower	Upper limit
	Agarophytes						· · · · · · · · · · · · · · · · · · ·		TO TO	11	12	13	14	15	16
The second	1. Gelidiella Acerosa			0.456	0.456	0.234	0.234	1.740	<b>1.</b> 740	, des ess		0.022	0.022	2.452	<b>2.4</b> 52
	2.Gracilaria crassa			<b></b>	<b></b>			0 <b>.5</b> 81	0.581	0.128	.0.128	Na j		0.709	0.709
eri Lugar	3.Gracilaria corticata	1.876	1.876			0.176	0.176				19 444	<b>49 44</b>		2.052	2.052
	4. <u>Gracilaria</u> edulis		: 	1.777	1.777	0.234	0.234	0.524	0.524	0.77.0	0.770			3.305	3.305
en en	5.Gracilaria foli <b>ifera</b>	0.117	0.117	0.178	0.178		otan 440							0.295	0.295
	6.Gracilaria		6. <del></del> 		<b></b>			10	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			0.038	0.038	0.038	0.038
	7. Hypnea musciformis	and the state of t				117 <b>.</b> 9 <b>3</b> 3	209.468		D. Test			<u></u>		117.933	209.468
	8. Hypnea pannosa			•. \	· · · · · · · · · · · · · · · · · · ·							0.354	0.412	0.354	0.412
	9.Hypnea valentiae	<b></b>		1.785	1.785	1.759	1.759	0.929	0.967				-	4.473	4.511
	Total	1.993	1.993	4.196	4.196	120.336	211.871	3.774	3.812	0.898	0.898	0.414	0.472	131.611	223.242

•	2.	3.	4.	5.	6.	7.7:	8.4	9.	10.	11.	12.8	13.	14.	15.	16.
 .lai	nophytes											<b> </b>			
					T tak B	1,7,3,6				*** · · ·			• • •		
• (	ystoseira rinodes	0.469	0.469	-	·			-	-	-	-			0.469	C.46
	And the second s				*** **					0.105	0 405		* \$13	0.405	
• 5	sargassum llicifolium			-	<del>-</del>	-	-	-	***	0.185	0.185			0.185	0.18
			,			0.075	0.075			And the			er en en	0.075	0.07
• 5	Sargassum olagiophyll	ım		-		0.075	0.075		_	•	-	-	- -	0.075	0.0
_				A11		_		4.282	8 <b>.77</b> 0	_				4.282	8.7
• 1	Sargassum swartzii			_			_	4.202	0.770		:			4.202	0.7
-	a source days	11.720	11 720	_	_		_	_	_				_	11.720	11 7
• 1	Bargassum enerrimum	11.720	11.720	_										11.720	****
	Sargassum	0.703	0.703	11 290	21.578	66.962	82.580		-		-	0.407	0.612	79.362	105 - 4'
	wightii	•,,,,,	0.703	11.200	21.370	00,302	02.000		,					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	103.1
, · · ·	T <b>urbin</b> aria			_	-	-	_	8.241	8.241			1.055	1.793	9.296	10.0
	ornata		•												
•	• •							3.740	•				• .1.1		
		40.000	40.000	44 000	04 580	67 007	00 655	40 500	47 044	0.405	O 4 O E	1 460	2 405	105 200	406.5
	Total	12.892	12.892	11.290	21.578	67.037	82.655	12.523	<u>17.011</u>	0.185	0.185	1.462	2.405	105.389	136.7
															**
													1		
											لحجيجي				ساخاتك الما

the production of the control of the

1 2	3	4	5	6	7.	8	9	10-	111	12		praide - A		
1. Ulva reticulata			3.418	3.418		107.030	2 422			12	13	14	15	16
2. Caulerpa				27 7 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			3.433	3.433	-		0.184	0.184	7.035	7
sertula- rioides			0.069	0.069	-	-		-	_			2 12, 4 4	0.069	
3. Caulerpa			e Tee e e				1. #							0
scalpelli- formis				•	-	- 1. i	•	-			0.209	0.209	0.209	0.
. Caulerpa			1.372	1.372			0.000			<u>.</u>		* i ()	ga ta a	
racemosa • Codium	2.345	0 045		· .		_	0.289	<b>0.</b> 289		<del>-</del>	0.321		ļ.	2.
tomanto- sum	4.545	2.345	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	-	-	-	2.641	2.641	1.852	1.852	•	_	6.838	
• Halimeda			_		. <del></del>								V•038	6.
gracilis					•		14.566	17.194	5.966	5.966		_	20.532	23.
• Udotea flabellum			-	-		<b></b>	0.643	0.643	2.887	2.887				
Colpome-	1.520	1.802	_	_	0.226	0.226	0.100						3.530	3.5
sinuosa						V•220	0.108	0.108	A		-	-	1.854	2.1
Hydrocla- thrus	0.130	0.130	43 <b>2</b> 1 45		-		0.078	0.078						
clathratus	to the set of the second							0.070	•	-	-	-	0.208	0.2
•Chnoospora implexa			- 1	-	7. 	-	0.228	0.228	_					
• Dictyota	J. 586	0.586	0.259	0.259	_		0 ===						0.228	0.2
dichotoma						_	0.720	0.720	0.231	0.231	-	-	1.796	0.79

Table - 13

Marine Algal Survey in the II Sector 1972-73

Mainland and Islands between Kilakkarai and Mukkaiyur

Groupwise Estimated standing crop (tons fresh weight) & their percentage

Mainland and the Islands	Productive area hectares	Agard Standin Lower limit	ophytes ng crop Upper limit	%	Alginor Standing Lower limit			Other sea standing Lower limit	eweeds crop Upper limit	%	Total of standing Lower limit		aweeds
Mainland	167.45	5.029	7.654	7.0	26.180	68 <b>.1</b> 34	47.0	24.973	66.521	46.0	56.182	142.379	
Upputhanni	20.04	1.993	1.993	7.0	12.892	<b>12.</b> 892	43.0	14.434	15.701	50.0	29.319	30,586	
Salli	7.69	4.196	4.196	12.0	11.290	21.578	46.0	18.433	14.681	52.0	28.919	40.455	
Nallathanni	461.29	120.336	211.871	6 <b>8</b> .0	67.037	82.655	31.0	1.340	1.340	1.0	188.713	295.866	
Yanaiparai	20.40	3.774	3.812	7.0	12.523	17.011	29.0	30.816	34.488	64.0	47.113	55.311	
Palliamunai	44.25	0.898	0.898	2.0	0.185	0.185	0.5	45.865	54.797	97.5	46.948	55.889	
Nandəmukhi	1.41	0.414	0.472	12.0	1.462	2.405	53,0	1.097	1.396	35.0	2.978	4.273	
- Total	722,55	136.640	230.896	36.0	131.569	204.860	33.0	131.958	188.924	31.0	400.167	624,680	

Table - 14

# Marine Algal Survey in the III Sector 1973-74 Mainland between Mukkaiyur and Punnakkayal (Tuticorin) Depthwise Estimated Standing Crop (Kg. fresh weight)

		uq === to == == == == == == == == == == ==	Under	continu	ous dis	tributi	on	Under	discrete d	līstrību-	Total St Cro	
Sr.	Species	Depth	Area sq.m.	Mean <sub>2</sub> de (g/m²) standar	nsity and	Standi Crop Lower	Upper	Area Sq.m.	tion Mean de- nsity	- Standing Crop	L•wer Limit	Upper Limit
4		3.	4.	x + s	е	Limit 6.	Limit 7.	8	(g/m <sup>2</sup> )	10	_11	12
<u>1.</u> Aga	rophytes	. Copp and Tree Tree and Copp				· .	Secretary.	. Figure				:
		1.0	<b></b>	_	. 🚣	<b>-</b> 400	<u></u> (200	600	8.33	·· 5	5	5
1.	Gelidiopsis repens	0.5				-	-/	600	50.0	30	30	30
2.	Gelidiopsis variabilis	0.0	<b></b>	_	<del></del>	****	<b>-</b> ;	650	11.66	8	8	8
3.	Gracilaria corticata	0.5	2950	522.3	468	<b>1</b> 63	2924	***		-	163	2924
	•	0.5	: 2750			~~		-		÷.	<u> 171</u>	2932
	. Total	•						600	6.66	4	4	4
4.	Gracilaria crassa	0.5	-		-	-	•••	9350.	5	47	47	47
		1.5	-	· · · · · · · · · · · · · · · · · ·			• • • • • • • • • • • • • • • • • • •	9330			51	51
	Total			4.9		***				•	Marian Series	
-	Gracilar <u>ia edulis</u>	0.5	<u> </u>			_	-	600	5	3	3	3
5.	Gracifalia edulis	1.5	9350	134.5	77.4	10834	1981	•••	-	-	534	198 <b>1</b>
	Total						13.				537	1984
	Total					_		600	6.66	4	4	4
6.	Gracilaria foliifera	0.5						550	3.33	2	2	2
7.	Hypnea valentiae	Intertidal	****	<del>-</del>	-			9350	8,33	78	78	<b>7</b> 8
		1.5					<b>-</b>	9330	0,00	, ,	80	8.0
	Total					gan garan ay ka s <del>a</del> n ta				• 	878	5086
	Grand Tot	al										

	1.	2.	3.	4.	5	• *** *** *** *** *** ***	6.	7.	8.	9.	10.	11.	12.
	Alc	inophytes	•	ø.			٠,				1800 can be to the con the sing the sing of		And the state of t
	1.	Sargassum wightii	0.5	* .	-	<b>.</b>		. 1 ° 1 ° 1 ° 1 ° 1 ° 1 ° 1 ° 1 ° 1 ° 1	600	26.66	16	16	16
	·• ,		1.0	•••	<b>-</b> -	<b>-</b>			600	1 <b>35.</b> 33	80	80	80
		Grand Total	*	4 · 2		*	1 5th jab ju					96	96
*	Oth	er Seaweeds				N.	* #* -	e Service			*.		
	1.	Enteromorpha prolifera	0.5		. ••	<b>-</b>	-	_	2350	5.0	12	12	12
	2.	Chaetomorpha littorea	Inter- tidal		***	_	_		600	80.0			
			0.0	2850	14.5	1.76	29	36	- 000	-	48	48	48
ا المام المام المام المام ال		Total				40,0				_	<b>-</b> ;	29	36
en En en en en	3.•	Cladophora fascicularis	Inter- tidal	_					600	0.5.5.5	,	<u>77</u>	84
	4.	Caulerpa sertulariodes	11	_			<b>-</b>	_	600 550	26.66	16	16	16
	· :		1.0		_	_	_	<b>-</b>		1.66	. 1	. 1	. 1
		Total				<del>-</del>		<b>-</b>	600	28.33	17	17 18	17 18
	5.	Caulerpa scalpelliformis	1.0	8000	197.5	90.2	858	2302	<b>-</b>	_		858	2302
	a a		1.5	41600	1800	634.2	48489	101271	-			48489	101271
			2.0	_	-	_	_		357450	160	57192	57192	57192
;		Total				• .						•	160765
e e e	6.	Halimeda macrol <b>ob</b> a	0.5	_	<u>.</u>			-	600	63.33	38	38	38
			1.0	-	-	•		<b>-</b>	600	28.33	17	17	17
事: - 1	<i>:</i> ,	Total		<u>-</u>				•	en de la companya de La companya de la co	•		55	55
	7.	Udotea flabellum	1.0	-		-	_		4700	16.66	* 78	78	. 78
	8.	Padina gymnospora	0.0	-	,* <b></b>		_	<b>-</b>	300		4	4	4
	9.	Padina tetrastromatica	0.0		-		-	-	300	5.0	2	2	2

											71 -3
1. 2.	3.	4.	5.		6.	7.	8.	9.	10.	11.	12.
9. Padina tetrastromatica	0.5	_	-	-	-		600	5.0	5	5	3
Total Total									5	5	5
10. Pocockiella variegata	1.0	- /	-		•		23450	40.0	938	938	938
	1.5	9350	56.6	19	352	707	-	-	-	352	707
Total	14 <sup>1</sup> *		* *		•		•		•	1290	1645
11. Spatoglossum asperum	0.5	- ;	-		_		600.	56.66	34	34	34
Statement of the statem	1.0	_	-		-	-	600	23.33	14	14	1.4
Total		* 							ã.	48	48
12. Jania adhaerens	0.0	· · · · · · · · · · · · · · · · · · ·	•••		-		 300 · .	26.66	. 8	8	3
	0.5	600	67.5	8.7	35	46		-	•••	35	46
	1.0		<b>-</b> ,		-	-	3300	23.33	<b>7</b> 7	77	77
	2.0	•	-	-			357450	3.33	1190	1190	1190
Total		ji	• •					4.		1310	1321
13. Grateloupia filicina	0.0	35250	320	68.7	8858	13701			-	8858	13701
14. Sarconema filiforme	4.0	-	-	-			48750	6.66	325	325	325
15. <u>Solieria robusta</u>	4.0	48750	32.5	8.7	1160	2008			***	1160	2008
16. Champia parvula	2.0	_		•		<b>→</b> :	357450	316.66	113190	113190	113190
17. Centroceras clavulatum	0.0				· -	10 <u>44</u> 10	650	33.33	22	22	22
	0.5	-	-		-	-	45200	66.66	3013	3013	3013
Total	e e ese como como como como como como como com	ers experiences and respectively	And the second of the second of the second	The Charles of the Control of the Co	•	٠.	* ·	•		3035	3035
18. Spyridia insignis	1.0	- "; "	-		-	•	600	6.66	4	4	4
	1.5	-			· · · · · · · · · · · · · · · · · · ·		27450	5.0	137	137	137
	4.0	48750	17.5	1.8	765	941	-	-	-	765	941
Total			·			•				906	1082

	, was noted from every what many sired with every	and and will have now had now how how they may had been cont and with the self-and	) 	4. ,	5.		6.	7.	8.	9.	10.	1:	1.	12.
1	. 2.	and the the the trip code the time and the time that the time time and the time	3.	72 0. <sub>2</sub>					650	8.33	5		5	5
1	9. Acantho	phora spicifera	0.0	<b></b>		, . <del></del>	-	<del></del> :					407	1015
2	0. Chondri	a armata	Inter- tidal	8625	82.5	35 <b>.2</b> 7	407	1015		•	<b>***</b>		407 363	433
			0.0	1850	215	19	363	433	-		<b></b> . • • •		- 770 - 770	1448
	· William of	m	0.0	100	* .			<del></del>					110	The same of the same
	1	Total				ta de la companya de		•		05.0	14		14	1
	21. Herpos	iphonia stuposa	Inter- tidal	-			<b>=</b> .	-	550	25.0	14		14	1
		•	0.0	<b>-</b>		•	-	**	2850	5.0 60.0	141	·2,	141	14
			0.5	-	<b>.</b>	_	-	•	2350	00.0	<u> </u>		169	16
		Total			•	e de la companya de l			· · · · · · · · · · · · · · · · · · ·	, ,	4770		170	17
	#		U.O		_	-	-	-	1850	91.66	170 30	ř	30	3
	22. Lauren	cia nana	0.5		-	_		•	600	50.0	62	, e	62	. 6
		cia papillosa	1.5		-	en grande de la companya de la comp			9350	6.66	02	. 2	38332	
	24. Lyngby	a sp.							•			gastragerase for		
		Grand Total	· · · · · · · · · · · · · · · · · · ·		e. Lista de la composição de		in the second	to the state of th	e e e e e e e e e e e e e e e e e e e					
												į		
				ત્રાસ્ત્ર કર્યો અને દાર્શ પહોંચ કર્યા કર્યો હતું કહેલે										_e, V30
			al of all			(Total )	product	ive area	a 62.642	5 ha.)	:	239106		3044
		Tot	al of all	seaweed						ا معارض در معارضاً المعارضاً	• • • • • • • • • • • • • • • • • • •	2.00 10.00		Commence of the Commence of th
4.											•	A Total		
- ,						American Control of the Control of t	And the second second		4. ***	•				



### Marine Algal Survey in the III Sector 1973-74 Karaya Island

#### Depthwise Estimated Standing Crop (Kg. fresh weight)

	ه همه الحق والمن والمن الكل الكل الكل والله والله الكل الكل الكل الكل الكل الكل الكل		Under			tributio	n		discrete d			tanding Cro
Sr. No.	Species	Depth	Area sq.m.	Mean <sub>2</sub> d (g/m²) standa error	<u>r</u> d	Standi Lower Limit	ng Cro Upper Limit		Mean density (g/m <sup>2</sup> )	Standing Crop	Lower Limit	Upper Limit
1.	2.	3.	4.	5		6.	7.	8.	9.	10.	11.	12.
Agai	rophytes		-									•
1.	Gracilaria edulis	1.0		-	_	<u> </u>		51637	3,33	172	172	172
2.	Gracilaria foliifera	1.5	-	_	-	<b>-</b>	-	75735	1.66	126	126	126
3.	Hypnea musciformis	1.0			-	-	-	<b>51</b> 637	11.66	602	602	602
		1.5	75735	80	19.8	4559	<b>7</b> 558		~	-	4559	7558
		2.0	251876	342.5	223.4	29998	14253	6 -	-		29998	142536
	Total										35159	150696
4.	Hypnea pannosa	1.0	<b></b>	-	-	-	-	51637	30	1549	1549	1549
	Grand Total	1					•		•		37006	152543
Oth	er Seaweeds											
1.	Dictyota bartayresiana	1.5	-	· <b>-</b>	_		_ ':	75735	1.66	126	126	126
2.	Dictyota maxima	1.0		-	-		-	51637	5.00	258	258	258
<b>3</b> .	Padina gymnospora	1.0	51637	<b>7</b> 7.5	43.8	1740	6263	-	-	-	1740	6263
		1.5	-		-		-	<b>75</b> 735	23.33	1767	1767	1767
		2.0	-	-	wa.	-		251876	15.0	3778	3778	3778
	Total									•	7285	11808
									•			-

1.	2.	3.	4.	5 <sub>•</sub>	*.	6.	7.	8.	9.	10.	11.	12.
4.	Sarconema filiforme	1.0						51637	6.66	344	344	344
5 <b>.</b>	Solieria robusta	1.0	· _	•••	_	-	_	51637	3.33	172	172	172
		2.0	-884	•		***	· <del>-</del> ,	251876	1.66	418	418	418
	Total		• .						•		590	590
5.	Spyridia insignis	1.0	-	***	-		-	51637	3.33	172	172	172
		1.5	•	•	-	-	• •	772735	5.0	379	379	379
		2.0	-	•	-	-	•	251876	33.3	8387	8387	8387
	Total		3 d								8938	8938
	Grand Tot	al					,				17541	22064
			. •	•						%.		
;				•							•	•

F

#### Marine Algal Survey in the III Sector 1973-74

Island Challi Depthwise Estimated Standing Crop (Kg. fresh weight) Total standing Under discrete distri-Under continuous distribution Crop Sr. bution Standing Crop Mean, density Area Depth Species Standing Lower Upper No. Mean Lower Upper Area  $(q/m^2)$  and sq.m. density Crop Limit Limit Limit sq.m. Limit standard er- $(g/m^2)$ ror x + se 12. 10. 11. Agarophytes 398 **39**8 398 59770 6.66 1.0 Gracilaria edulis 3272 1315 3272 1315 61160 37.5 16 2.0 1713 3670 Total 1295 1295 59770 21.66 1295 1.0 Hypnea musciformis 612 612 10.0 612 61160 2.0 1907 1907 Total **117**2 1172 1172 31970 36.66 0.5 Hypnea valentiae 645 849 645 849 12.5 1.7 1.0 59720 555 66720 8.33 555 555 1.5 2576 2372 Total 8153 5992 Grand Total Alginophytes 2770 2770 2770 86.66 31970 0.5 Cystoseira trinoides 1. 7131 7131 7131 61160 116.6 2.0 Sargassum wightii 2. 9901 9901 Total

			5.		6.	7.	8.	9.	10,	11.	12.
. 2.	3.	4.									
ther Seaweeds			_	4 7	660	868	en e	<b></b>	_	660	. 86
Microdictyon tenuis	2.0	61160	12.5	1.7			61160	3.33	204	204	20
Halimeda macroloba  Padina gymnospora	2.0 1.0	<b>-</b> 59770	<b>-</b> 155	- 67 <b>.</b> 1	<b>5</b> 854	132 <b>7</b> 5	- 66720	<u> </u>	· <b>-</b> 444	5854 444	132 <b>'</b> 4
	1.5 2.0	- 61160	<b>-</b> 150	99	3180	15228	A Market State of the Communication of the Communic	<del></del>		3180	152 289
										9478	_203
Total	at at					; ;	59770	8.33	498	498	<b>( )</b>
. Solieria robusta	1.0			-	<del>-</del>	m·					<i>(* 1</i>
		. •								10840	305
Grand Tota	1		upin P								
		al of all	L seawee	ds	(Total r	productiv	e area •	21.9	620 ha)	26.733	48.
and the second s		· .			err .					• •	

Table - 17

## Marine Algal Survey in the III Sector 1973-74 Van Island Depthwise Estimated Standing Crop (Kg. fresh weight)

Sr.	Species	Depth	Area	Mean d	ensity	stributic Standin Lower	g Crop		der discre	on		tanding
140.	ppecies	Береп	sq.m.	(g/m²) standa x ±	rd error		Upper Limit	Area sq.m.	Mean de- nsity <sub>2</sub> (g/m²)	Standing Crop	Lower Limit	Upper Limit
1.	2.	3.	4.		5.	6.	7 o	8.	9.	10.	11.	12.
Agaı	cophytes						en e					•
4: .⊾ •	Gracilaria edulis	1.5	64285	35	17.6	1119	3381	<del></del> -	-		1119	3381
	Above dies Sprantig Althography product op a register over the sprantig and the sprantig an	2.0	-		-	-	•••	338195	40.0	13527	13527	13527
	Total		•								14646	16908
2.	Gracilaria foliifera	1.5			-	. : · · · · · · · · · · · · · · · · · ·	_	64285	3.33	214	214	214
3.	Hypnea musciformis	1.5	64285	42.5	12.3	1941	3522	<b>4</b> 0. <b>♦</b>	•	_	1941	3522
		2.0	. =	_	***		a	3 <b>38195</b>	50.0	16909	16909	16909
	Total				•		•			•	18850	20431
4.	Hypnea <b>v</b> ale tiae	1.5	-	<b>-</b>	-	-		64285	126.6	8138	8138	8138
• • • • • • • • • • • • • • • • • • • •		2.0	338195	80	48	10822	43288	_	-	-	10822	43288
•	Total								and the second second		18960	51426
	Grand Total		e e e e e e e e e e e e e e e e e e e				and tight. The second of the second of		. *	: · · · ·	52670	88979
Alg:	inophytes	-NIL-			-NIL-		-NIL-			-NIL-		-NIL-

		,	- T	v.			-						78
1.	2.	و همين مينه وي مين مين وي مين مين وي	3.	4.	5.		6.	7.	8.	9.	10.	11.	12.
Othe	er Seaweeds												
1.	Caulerpa cupress	soides	2.0	· <b>_</b>	-	· • .		-	333195	1.66	561	561	561
2.	Caulerpa scalep.		2.0	338195	375	145	<b>7</b> 7784	17 <b>5</b> 861	_	-	-	77784	175861
3.	Spyridia insign:		1.0	-		-			71272	3.33	237	237	237
	gassegi - Allein kunn gerri gerri og 1 rejenne - Allein ken rejesti kunn bleve		1.5	-	-	-	<b>-</b>	<b>-</b>	64285	3.33	. 214	214	214
•	Tota	1		Je in		•		•				451	451
	Grand Tota	a l									••	78796	176873
	Oldina 100.												,
		Total o	f all	seaweeds	(Total	product:	i <b>v</b> e area	<b>-</b> 47.37	752 ha)			131466	265852
						•• ·		i J				e <sub>res</sub>	

Table - 18

Marine Algal Survey in the III Sector 1973-74

Mainland between Kukkaiyur and Punnakkayal (Tuticorin)

Species-wise Estimated Standing Crop (tons fresh weight)

	Species	Standing	
Group	• Opecited	Lower	Upper limit
		limit	
	1. Gelidiopsis repens	0.005	0.005
Agarophytes	2. Gelidiopsis variabilis	0.030	0.030
	3. Gracilaria corticata	0.171	2.932
	4. Gracilaria crassa	0.051	0.051
	5. Gracilaria edulis	0.537	1.984
	6. Gracilaria foliifera	0.004	0.004
	7. Hypnea valentiae	0.080	0.080
	Total	0.878	5.086
Alginophytes	1. Sargassum wightii	0.096	0.096
_ ~ ~	ds1. Enteromorpha prolifera	0.012	0.012
Other seaweed	2. Chaetomorpha littorea	0.077	0.084
	3. Cladophora fascicularis	0.016	0.016
	4. Caulerpa scalpelliformis	106.539	. 160 <b>. 7</b> 65
	5. Caulerpa sertularioides	0.018	0.018
	6. Halimeda macroloba	0.055	0.055
	7. <u>Udotea flabellum</u>	0.078	0.078
•	8. Padina tetrastromatica	0.005	0.005
	9. Padina gymnospora	0.004	0.004
:	10. Pocockiella variegata	1.290	1.645
	11. Spatoglossum asperum	0.048	0.048
	12. Jania adhaerens	1.310	1.321
*	13. Grateloupia filicina	8.858	13.701
,	14. Sarconema filiforma	0.325	0.325
	15. Dolritis Cobusta	1.160	2.008
	16. Champia purvula	113.190	113.190
	17. Centroceras clavulatum	3.035	3.035
	18. Spyridia insignis	0.906	1.088
	19. Acanthophora spicifera	0.005	0.005
	20. Chondria armata	0.770	1.448
	21. Herposiphonia stuposa	0.169	0.169
	22. Laurencia nana	0.170	0.170
	23. Laurencia papillosa	0.030	0.030
	24. Lyngbya majuscula	0.062	0.062
	Total	233.132	299,276
	Grand Total	239.106	304.458
		======	======

#### Marine Algal Survey in the III Sector 1973-74

### Islands between Mukkaiyur and Punnakkayal (Tuticorin) Specieswise Estimated Standing Crop (tons fresh weight)

Sr.		Karaya I Standing		Challi Is		Van Is Standing			Cotal Hing Crop
No. 1.	Species 2.	Lower Limit 3	Upper Limit <sup>4</sup>	Lower Limit 5	Upper	Lower 6 Limit 7	Upper Limit	Lower B Limit 9	Upper 10 Limit
Agarophy	tes								
1.	Gracilaria edulis	0.172	0.172	1.713	3.670	14.646	16.908	16.531	20.750
	Gracilaria foliifera	0.126	0.126	·	-	0.214	0.214	0.340	0.340
2.	Hypnea musciformis	35.139	150.796	1.907	1.907	18.850	20.431	55.916	173.034
3.		1.549	1.549		-	-	-	1.549	1.549
4.	Hypnea pannosa			2.372	2.576	18.960	51.426	21.332	54.002
5.	Hypnea valentiae Total	37.006	152.543	5.992	8.153	52.670	88.979	95.668	249.675
Alginoph	nytes		en e						
1.	Cystoseira trinodis			2.770	2.770	•	-	2.770	2.770
2.	Sargassum wightii	<u></u>		7.131	7.131			7.131	7.131
2.	Total			9.901	9.901	<u></u>	<b>-</b>	9.901	9.901
Other Se								or the matter of the second se	
1.	Caulerpa cupressoides	* <del>=</del> .;*	es e 🗪	, <del></del>	<b></b>	0.561	0.561	0.561	0.561
2.	Caulerpa scalpelliformis	<b>-</b>	-	. <del></del>	••••••••••••••••••••••••••••••••••••••	77.784	175.861	77.784	175.861
3.	Microdictyon tenuis	-	<b>-</b>	0.660	0.868	_	-	0.660	0.660
4.	Halimeda macroloba	<u>-</u> :	•••	0.204	0.204	•	<b>(***</b> )	0.204	0.204
5.	Dictyota bartayresiana	0.126	0.126	orenia de la composición dela composición de la composición de la composición de la composición de la composición dela composición de la composición de la composición dela composición dela composición de la composición de la composición dela composición de la composición dela composición dela composición dela composición dela composición dela composición dela composici				0.126	0.126
		0.258	0.258	······································	10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	on and the second of the secon	· · ·	0.258	0.258
6.	Dictyota maxima	7.285	11.808	9.478	28.947	•	•	16.763	40.755
7.	Padina gymnospora	0.344	0.344		-	-		0.344	0.344
8.	Sarconema filiforme	U.344	0.044	<del></del>					

					# 1				81
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Other S 9. 10.	eaweeds Solieria robusta Spyridia insignis	0.590 8.938	0.590 8.938	0.498	0.498	- 0.451	0.451	1.088 9.389	1.088 9.389
en de la companya de	Tot		22.064	10.840	30.517	78.796	176.873	107.177	229.454
	Grand Tota	54.547	• 174.607	26.733	48.571	131.466	265.852		
	Total of all sea	aweeds : (Total	productive	area : 107	.2620 ha)			212.746	489.030
			14 <sup>8</sup> (						

Table - 20

# Marine Algal Survey in the III Sector 1973-74 Mainland and Islands between Mukkaiyur and Punnakkayal (Tuticorin) Groupwise Estimated Standing Crop (tons fresh weight) and their percentage

Mainland and the Islands	Productive area ha.	Agarop Standing Lower Limit		%	Algino Standin Lower Limit		%	Other Se   Standi   Lower   Limit	aweeds ng <b>Crop</b> <b>Upper</b> Limit	%	weeds	all Sea- ding Crop Upper Limit
Mainland	62.6425	0.878	5.086	1.10	0.096	0.096	0.04	238.132	299.276	98.86	239.106	304.458
Karaya Island	37.9248	37.006	152.543	82.70	-	• • • · · · · · · · · · · · · · · · · ·		17.541	22.064	17.30	54.547	174.607
Challi Island	21.9620	5.992	8.153	18.80	-9. <del>9</del> 901	9.901	26.30	10.840	30.517	54.90	26.733	48.571
Van Island	<b>47.</b> 3752	52.670	88.979	35.65	e ye <b>rs</b>		_	78.796	176.873	64.35	131.466	265.852
Total	169.9045	96.546	254.761	28.20	9.997	9.997	1.60	345.309	528.730	70.20	451.852	793.488

# Marine Algal Survey in the IV Sector 1974-75 Mainland between Punnakkayal (Tuticorin) and Cape Comorin (Kanyakumari) Depthwise Estimated Standing Crop (Kg. fresh weight)

•			Depthwis	e Estimated Stan	arid crop (						
sr.		Depth	Under Area	continuous distr Mean density	ibution Standing	Crop	Under d Area	liscrete dis Mean den-	Standing	Total St Cro	p
No.	Species	Береп	sq.m.	(g/m²) and standard error x + se		Upper Limit	sq.m.	sity (g/m²	) Crop	Lower Limit	Upper Limit
 1.	2.	3.	4.	5.	6.	7	8.	9.	10.	11.	12.
Agar	rophytes		***	••							
1.	Gelidium micropterum	0.0	1850	120.00 105.30	28	417	-		-	28	417
2.	Gelidiopsis repens	0.0	<b>-</b> ·		6 ( )		1100 2000 31000	10.00 15.00 25.00	11 30 775	11 30 775	11 30 <b>7</b> 75
	Total	2.0	-		•				***************************************	816	816
3.	Gelidiopsis variabili	1.0	16500 -	75.00 46.00	479	1997 <b>-</b>	1150	160.00	<b>-</b> 184 51	479 184 51	1997 184 51
		1.5 2.0 4.0	54750	15.00 3.70	619	1024	5100 - 11350	10.00	454	619 454	1024 454
	Total	100			·· .		,		n de la companya de La companya de la co	1787	3710
4.	Gracilaria compressa	1.5	· —		· • · · ·	-	8550	170.00	1454	1454	1454
5.	Gracilaria corticata	0.0 0.5 1.0	19450 26012 46100	148.70 57.00 251.25 128.00 130.00 13.80	3206 5357	4001 9865 6629	<u>-</u> -	-	-	1783 3206 5357 7041	4001 9865 6629 14207
	•	1.5 2.0 4.0	169987 101075 13700	62.50 21.08 118.57 62.77 100.00 63.60	5640	14207 18329 2230	 -	- -	-	5640 498	18329 2230
	Total			e e e e e e e e e e e e e e e e e e e						23525	55261
6.	Gracilaria crassa	0.0			•		550	10.00	5	5	5
7.	Gracilaria fergusoni	i 0.0 0.5 1.0	- 12150	69.30 28.90	- - 0 1 <b>491</b>	- 1193	550 2100 -	5.00 210.00	3 441 -	3 441 491	3 441 1193

1.	2.	3.	4.	5.		6	7.	8.	9.	10.	11.	12.
Alg	ginophytes	the map the was tree one will the time the same the tree										
1.	Sargassum plagio	0.5 1.0 1.5 2.0 4.0	1550 21512 33000 12600 69750	5425.00 7162.00 1214.00 2955.00 4596.60	3732.00 4613.00 896.65 2673.00 3634.00	2624 54846 10473 3553 67141	14193 • 253320 69651 70913 574084		10.00	- - - - 244	2624 54846 10473 3553 67141 244	1419 25332 6965 7091 57408 24
2.	Sargassum vulgar	0.0 1.0 1.5 2.0 4.0	16950 3000 162675 12350	961.25 2940.00 31.66 40.00	617.00 2633.00 6.42 13.53	5835 921 4106 327	26751 16719 6195 661	<b>-</b>	30.00	220	5835 921 4106 327 220 11409	2675 1679 619 60 23
3.	Sargassum wighti	0.5 1.0 1.5 2.0 4.0	1400 9800 121900 17050 36300	17.50 220.00 2588.33 4316.25 145.00	8.84 56.80 1790.15 3048.00 100.00	12 1599 97298 21624 1634	37 2713 533736 125560 8893		500.00	- - - - 12800	12 1599 97298 21624 1634 12800 134967	27 5337 1255 88 128 6837
4.	Sargassum sp.	0.5 2.0	3450 <b>-</b>	5350.00	2085.00	11264 -	25651 <b>-</b>	4300	230.00	989	11264 989	256 9
	Tota Gran	al nd.Total	* <b>*</b>	· · · · · · · · · · · · · · · · · · ·							12253 297510	266 17433
Oti	her Seaweeds:		till til til state s Frames i state									
	Enteromorpha in nalis Ulva fasciata			185.00 115.00	60.00 74.20	188	172 303			<b>-</b>	88 65	1
۷.	ning raperiara	0.5 1.0 1.5	32612 158025	135.71 92.08	91.10 34.08	1430	7423 19620			-	1430 8849	74 196

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1. 2.	3.	4	5.		6.	7.	8	9. 10.	11.	12.
Ulva fasciata	1.5 2.0 4.0	149862 140387 -	26.43 55.00	12.22 23.11	2130 4477 - 30	5792 10966 -	- - 11350	40.00 454	2130 4477 454 17405	5792 10966 454
Total  3. Ulva lactuca	0.0 0.5 1.0 1.5	2100 34650	25.00	13.00	25 	80 - 605	- 1850 - 5100	15.00 28 10.00 51	25 28 260 51	80 28 605 51
Total	2.0	8750	5.00	-	45	45	** <del>*</del>		45 409	45 809
4. Chaetomorpha littorea	0.0	1400	7.50 -	1.76 -	8	13	2100	175.00 <b>3</b> 68	8 368	13 368
Total					# W	A State of the Sta			376	381
5. Chaetomorpha torta  Total	0.5 1.0 1.5 2.0	11250 18300 22400 2900	55.00 22.50 37.50 45.00	31.8 5.30 22.40 29.03	261 315 338 46	976 508 1342 215	-		261 315 338 46 960	976 508 1342 215 3041
6. Cladophora fascicularis	0.5 1.0 1.5 2.0	4250 11900 1900	- 60.00 25.00 17.50	3.53 14.28 5.25	240 126 23	270 467 43	1850 - -	100.00 185	185 240 126 23	185 270 467 43
Total	2 · *		* ***						574	965
7. Cladophora utriculosa	2.0	-	••		. •	-	10050	10.00 100	100	100
8. Spongomorpha indica	0.5 1.5 2.0	82800 6200	126.00 30.00	112.20 18.03	- 1143 74	19723 298	2100 - -	20.00 42	42 1143 74	19723 298
Total		•				era (m. 1911). Orași de la compositori			1259	20063

1.	2.		3.	4.	5.	·	6.	7.	8.	9.	10.	11.	12.
	Cauloma	cupressoides	0.5						1850	15.00	.28	28	28
9.	Cautelba	Cupressordes	1.0	4550	32.50	1.76	140	156		• • · · · · · · · · · · · · · · · · · ·	•	140	156
			2.0	37850	<u>3</u> 0∙00	14.10	602	16.69	<b>→</b> (1000)	15.00	110	602 110	1669 110
		•	4.0	-	-	···	-	•	7300	13.00	110		
		Total							1.100	er Ser	7 - 4.1	880	1963
10.	Caulerna	fergusonii	0.5	5250	15.00	7.90	37	120	*** · .	***	••	37	120
10.	Cadicipa	TCI GUDOTTI	1.0	59075	258.57	122.20	8056	22494	-	- ***		8056	22494
•			1.5	147287	220.50	89.80	19250	45703	ayan	•	<b>∵.</b> =	19250 6424	45703 17625
	•	and the second of the second o	2.0	149462	80.45	37.47 74.25	6424 1304	17625 6056			44 <b>.</b> .	1304	6050
	<u>.</u>		4.0	32000	115.00	14.23	1304					35071	91998
		Total		• .			į.			ser4	*	33071	91990
14	anul ama	scalpelliformis	0.0	17050	85.00	75.80	157	2741	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	<b>:</b>		157	274
11.	Cautetba	Scarperrrrorming	0.5	_	_	-	-	_	1850	5.00	9.	9	
			1.0	10250	33.33	16.47	173	510		-		173	51 354
			1.5	75737	32.00	14.75	1306	3540		<b>-</b> ,	<del>-</del>	1306 9967	2577
	• . • • •	And the second s	2.0	343675	52.00 35.00	23.01 21.50	9967 492	25776 2059	_		-	492	2059
		Total	4.0	36450	35.00	21,00	472	2035	ાં છે. આ પ્રાથમિક શાળા કરાયે કરી છે. આ પ્રાથમિક	et.		12104	3463
		TOCAL				e <sup>1</sup> ca	7 8 °				, aver		
12.	Caulerpa	sedoides	1.0	6000	22.50	<b>1.7</b> 5	124	145		40.00	- 05	124	14
		,	1.5	. <del></del>		- A.			8550 4450	10.00 55.00		85 245	8! 24!
		1 · * ·	2.0			- -			4430	33,	240	**	
		Total						$\mathbf{c}(\mathbf{r}) = \mathbf{c}(\mathbf{r}) + \mathbf{c}(\mathbf{r}) = \mathbf{c}(\mathbf{r})$			ing die er de	454	475
4.0			2.0		tu <u>.                                    </u>		-		10050	5.00	50	50	5(
		sertularoides			_	_	_		1050	20.00		21	2:
	Codium c		1.5	-		_		ar e	6500	220.00		1430	1430
15.	. <u>Halimeda</u>	macroloba	1.5						0300	220,00	1430	*	
			2.0	48800	32.50	17.50	732	2440		-	•	732	2440
		The second secon	4.0	358125		6.43	2471		- ,	•	enter de la companya	2471	707
		Total	Section 2		Same and the same	en erre	e a communicación de la companya de	, garage de la servició de la servic				4633	1094
•	ه <del>بیو</del> ه مها در چین	general de la companya del la companya de la compan		177							graduate and the second		10740

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1.	2.	3.	4.	5.	/ 	6.	7.	8.	9.	10.	11.	12.
16.	Halimeda opuntia	0.5 1.0 1.5 2.0	4100 7800	20.00	3.53 8.83	67 246	96 375	1850 - 2700-	20.00	37 ··· 37 ··· 27	37 67 246 27	37 96 375 27
	Total					<b>5</b>		-148		· · · · · · · · · · · · · · · · · · ·	377	535
17.	Halimeda tuna	0.5 1.0 1.5 2.0 4.0	21600 611012 695812 628125	86.66 33.21 53.83 125.80	48.33 8.42 20.06 87.62	828 16147 23498 23981	2916 25436 51413 134054	2100	20.00	42	42 828 16147 23498 23981	42 2916 25436 51413 134054
	Total			•		•					64496	213861
18.	Udotea flabellum	2.0		<b>-</b>		so <sup>†</sup> edi So <sup>†</sup> ••••		10050	35.00	352	352	352
19.	Valoniopsis pachynema		-		•		-	450	15.00	7	7	7
20.	Dictyopteris delica- tula	1.0 2.0 4.0	3200 - 144700	30.00	14.14 - 37.41	51 1330	141 - 12156	28650	80.00	3092 3092	51 3092 1330 4473	141 3092 12156 15389
21.	Dictyota dichotc a	0.0	-					850	15.00	13	13	13
22.	Dictyota maxima	1.0	-					950	25.00	24	24	24
ē		1.5	60375	12:50	1.76	648	861	•	·	_	648	861
		2.0 4.0	60700 -	18.30	8.71	582 -	1639 -	7000	30.00	210	582 210	1639 210
	Total			V 19 S 10	rikaja.	er togene	•	•• • • • • • • • • • • • • • • • • • •	, 1 <sub>2</sub> 8	234	1464	2734
23.	Padina pavonica	1.5	•	I' <b>≜</b>		`	-	3000	10.00	30	30	30
24.	Padina tetrastromatica	0.0	16500	57.50	26.50	512 -	1386	<del>-</del> 38650	40.00	<b>-</b> 1546	512 1546	1386 1546
	Total			en e	Significant State of the State		· ·		en de la companya de La companya de la companya de	1546	2058	2932

1. 2.	3	4.	5			7	8.	9	10	11	14.
25 Pecockiella variegata	0.5 1.5 2.0						1850 11650 4300	5.00 20.00 30.00	9 233 129	9 233 129	23 12
Total	2.0	<del>-</del>			•				371	371	37
en e			105.00	· · · · · · · · · · · · · · · · · · ·	1274	2060	•	-		1274	206
26. Spatoglossum asperum	1.5 2.0 4.0	8550 625025 156700	195.00 433.63 817.30	46.00 246.90 175.60	116711 100554	425348 155587	_	<del>-</del> 	-	116711 100554	15558
Total	<b>+.</b> 0	150,00								218539	58299
		4050	470 00	77.80	725	1013			_	725	101
27. Stoechospermum	0.5 1.0	1850 5150	470.00 82.50	23.00	306	543	-	<b>-</b>	•	306	54
marginatum	1.5	19100	253.00	246.30	134	9542	_	<u>-</u>	-	134 - 11800	954 3907
	2.0	74600	341.00 135.00	182.82 67.20	11800 753	390 <b>7</b> 7 2244	_		_	753	224
and the second of the second o	4.0	11100	133.00	07.20	, 55		a tataki e Tara			13718	524:
Total		• •					01.00	100.00	210	210	, 2:
28. Levringia borgensenii	0.5	0050	16.05	6.66	77	<b>-</b> 184	2100	100.00	<del></del>	77	18
	1.0 1.5	8050 8550	16.25 21.66	10.68	94	276	-	_		94	2′
	2.0	107100	55.90	19.95	3850	8124	<b>-</b>	10.00	67	3850 6 <b>7</b>	812
	4.0	-					6 <b>7</b> 00	10.00	277	4298	88
Total	• • • •			• **				40.00		30	
29. Iyengaria stellata	1.5	-	-		***	<b></b>	3,000	10.00	30		- 1
30. Hormophysa triquetra	0.5	· · · · · · · · · · · · · · · · · · ·	-		-	, <del>-</del>	9250	150.00	1387	1387	13
31. Liagora pulverulenta	1.0		· · · · · · · · · · · · · · · · · · ·			<b>.</b>	4250 3000	25.00 10.00	106 30		10
	1.5	4. <del>-</del> 01. }			-		3000	10.00	50	136 486	1
22 Gainaia bengalica	2.0			garage to the second of the s	<b></b>		2700	180.00	486		4
<ul><li>32. Scinaia bengalica</li><li>33. Asperagopsis taxiformi</li></ul>					_	· -	2100	50.00	105		1
33. Asperagopsis taxiioimi	1.5	-		• • •	-		5100 2700	10.00 15.00	51 40		
	2.0				· · · · · · · · · · · · · · · · · · ·		2700	15.00	<b>4</b> 0	196	1
Total		A STATE OF THE STA		* * * * * * * * * * * * * * * * * * *			ng sangang mengangan sangan sanga Sangan sangan sanga		The state of the s	190	
	", "			and the second of the	and the second	and the second of the second o					

1.	2.	3.	4.	5.		6.	7.	8.	9.	10.	11	.302 12	2 <b>`.</b> ∛∵
34.	Chondrococcus horn-	<b>2.</b> 5		-	***		***	<b>95</b> 50	10.00	<b></b> 25	<u>-</u> 25		
	emanii Total	2.0		****		. · · · · · · · ·		19050	15.00	286	25 2 <b>3</b> 6		
35.	Amphiroa anastromo-	0.5	entage of	<b>-</b> `		er english	• • • • • • • • • • • • • • • • • • •	3450	00.00	··· 040	311	311	
	sans	1.0		197.50	107.83	1444	4916	3430	90.00	310	310		
e .		1.5		133.75	87.55	699	<b>33</b> 32	- Male	-	_	1444 6 <b>9</b> 9	4916 3332	
	Mark was a second of the secon	2.0	and the second s	299.16	116.69	24830	76255	and the second of the second o	<del>-</del>		24830	76355	
	Total	4.0	189000	198.75	168.80	5660	69467	·	•,/		5660	69467	
36.	Amphiroa anceps	0.0		-				450	· "		32943	<b>1</b> 54380	
*	The state of the s	1.0	120650	26.25	12.00	1719	4615	450	30.00	13	13	13	
		1.5	211550	150.60	112.20	8124	55595	-		-	1719	4615	
		2.0	353250	220.00	135.80	29744	<b>1</b> 25686	_	_	~	8124	55595	
		4.0	529375	369.00	228.70	74377	316513				29744 74377	125686	
37.	Total	4 -				en e					113977	316513 502422	
3/•	Amphiroa foliacaa	1.5 2.0		-	• /*4		-	3850	160.00	616	616	616	
	Total	2.0	•••• · · · · · · · · · · · · · · · · ·	-	<b>-</b>	-	-	4450	135.00	601	601	601	
38.	Amphiroa ragili-	0.0	-	<b>-</b>	_		1	4466	_		1217	1217	
• .	ssima.	0.5	$ x  = \frac{1}{2} \left( \frac{x}{2} - \frac{x}{2} \right)^{\frac{1}{2}} = \frac{1}{2}.$		-	_	<b></b>	1100	20.00	22	22	22	
		2.0	72450	198.33	170.47	2018	262720	2100	50 <b>.</b> 00	105	105	105	
39.	Total		4.1.				202720			-	2018	26720	
39.	Cheilosporium spe- ctabile.	0 0	1500			* * * * * * * * * * * * * * * * * * * *				•	2145	26847	
	CCODITIE	0.0	1500	55.00	<b>17.</b> 60	56	109	- 109	- 4	_	56	109	
		1.0	20050	88.33	 E1 E0	-	- <u>-</u> 1,2%	2550	40.00	102	102	109	ŧ
		1.5	163850	64.28	51.50 20.01	738	2803	<b>-</b>	-	73"	738	2903	
		2.0	326062	48.50	15.00	7254 10923	13811	<b>-</b>	-	-	7254	13811	****
40 -	<u>Tetal</u>				13.00	10923	20705		<b></b>	- :	10923	20705	
40. <u>J</u>	lania adhaerens	0.0	<b>1</b> 6500	30.00	14.10	263	728				19073	37530	
		2.0		-	-	_	- 720	25400	15.00	204	263	728	
* · ·	Total					t	*	23400	12.00	381	381	381	
41 T	in a de la companya d	_		•							644	1119	
41. <u>J</u>	ania iyengarii	0.5	-	=	-	-	-	3450	40.00	120	4.00		
		1.0		-	•		<b>-</b>	14050	50.00	138 702	138	138	
	Total				en e	• • • • • • • • • • • • • • • • • • • •			50.00	102	702	7.02	-
	$\langle \bullet \rangle = \langle \cdot $								en e	•	840	840	
							The second second				, the second of		,

1	2	3	4	5		6	7	8	9	10	11	12
<b>4</b> 2.	Cryptonemia coriacea	ം.0	14100	90.00	67.25	391	2217	The second secon	nig nor	• • • • • • • • • • • • • • • • • • •	391	2217
43.	Grateloupia filicina	1.0	**************************************					-1850	10.00	18	18	18
44.	Grateloupia lithophila	0.0	2100	96.25	28,50	142	262			<b></b>	142	26.2
	TICHOPHIE	0.5 1.0 1.5	2650 6000 6650	50.00 7.50 12.50	28.30 1.76 1.76	58 34 71	208 55 95				58 34 71	208 55 95
:		2.0 4.0	413700 11350	23.00 15.00	10.73 3.53	5076 130	13954 . 210		And the second s	major dello	5076 -130 .	13954
· · · .	Total							4400	055.00	201	5511 281	14784 281
45.	Corynomorpha prismatica	2.0	5950 2900 106025 652850 823000	244.00 37.50 96.11 142.36 15.82	221.00 8.84 41.20 38.95 <b>4.1</b> 6	137 83 5822 67511 9596	2767 134 14558 118368 16433	1100	255.00	281	137 83 5822 67511 9596	2767 134 14558 118368 16443
m	Total								Bird Bird Bird Bird Bird Bird Bird Bird		83430	152551
46.	Sarcodia cevlanica	1.0 1.5 2.0 4.0	17850 69325 59650 25050	142.00 57.50 66.25 120.00	104.00 33.90 34.70 82.00	678 1636 1882 952	4391 6336 6022 5060	1850   	30.00	55   	55 678 1636 1882 952	55 4391 6336 6022 5060
Vicinity of the Con-	Total		The second secon		aur auto, caris - Impair du ribilitàrio principa e		and and a second second second second	ne, annibilità de describer e la collisión de	in the second		5203	21864
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	7.7.7 34 7.7.7	06 3¢ 75	<b></b> ⊅€	T0°00	3450	271	06 	00.5	10.00	0908T	7°0 7°2	Champia parvula	• <del>•</del> ъс
	911	701	CV	00 00	OOFG		ang ang ina a sa anak selasi	er en general general general services	en la graphica de la capacidad	Special Control of the Control of th		Total	-
k Company one continue	99 . TS	99 IS	īs	 10°00	0019	S9	99	9L •I	22,50	2700	5°0	Champia compress	່ •ຍ⊆
An Dudwiese	168665	08763			entre tille dillition i Prince Mentille (1,000 annique en la communication de la commu	t veille er er et til er flette de tekner i veren er						TotoT	
	123027 12553 85	87819 7487	 58	  TO*OU	  0998	123027 12553	87819 2784 27849	8.70 127,80	26.42 26.42	328125 <b>44282</b> 0	7°0 7°0 1°2	Coelerthrum oppuntie	
and the state of t	0 <b>₹1</b> 907	35838	The state of the s	The second secon	The second secon			The second secon	appropriate the second	The second secon		Total	
	98515	22152				98919	22152	09*96	242,00	125320	0.4	<u> Tebtobogs</u>	
	124224	18701				124224	18701	00 888	1021,25	09608	5.0	<u> Bodungens</u> <u>Bodikocjadia</u>	
	<b>45</b>	<b>4</b> S	<b>L</b> S	00°09	usii 🐭	e de		<b></b>		ada 6277	0.0	Cymnodongrus	
water states	L9L9	ZUQU	Mariner anger on our tree tree	mana ang sa managananggan ini naman sa	o programa. Politica	in the second se	and the second s					LetoT .	
A COMPANY AND LOCAL	222 5475 70	222 1768 70	722 222	150°00	000Z 098I		8941	01.7E	72,50	09667 	₫°0 5°0	Solieria indica	• <b>6</b> 1
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55.	Centroceras clavulatum	0.0 0.5 1.0 1.5			200 and 200 an			gas das agai suo usa assa usa assa		4150 1750 950 3000	10.00 60.00 60.01 20.01	11 105 57 60	11 105 57 60	12 195 57 60
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56.	Market in a supplemental transmitted for the contract of the c	0.0		nar allemania (n. 14 annie 14 Annie 14 annie 14 an				- 3	Appelle security constitution of the security	1050 38650	330.07 20.00	347 773	347 773 <u>/</u> .	347 7 <b>73</b>
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57.	Name and Address of the Owner, where the Party of the Owner, where the Party of the Owner, where the Owner, which the Owner,	4.0	The state of the s	man a angar in salah sandah in salah s Manga dalah		440				11350	45.07	511	511	511
58.	duperrevi Wrangelia argus	0.5 1.0 1.5 2.0	  17300	32.50	21.76	  186		939		550 4250 3450	20.00 20.00 15.00	11 85 52	11 85 52 186	11 85 52 939
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59.	Acanthophora spicifera	0.0						made with them to a 10 feet of 10	erica i e un est estamento ma	5150 1300	60.00 10.01	63 13	63 13 76	63 13 76
50,	Total <u>Chondria Armata</u>							 924		5150 - <b>-</b>	15.00	76	76 574	76 924
	Total	2.0	49950	15.00	3,50	574						:	650	1199

	-
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											,	94
1	2	3	4	ر حلت منب الله جبير مين منت	5	6	7	8	9	10	11	12
	ticocladia ifera	0.0 0.5 1.0 1.5 2.0 4.0	2450 29100 24350 489275 882075 990100	30.00 418.75 83.75 108.88 102.50 161.40	13.53 411.85 71.35 63.10 37.03 42.40	40 201 302 22399 57749 118188	106 24171 3776 84145 123076 201416				40 201 302 22399 57749	106 24171 3776 84145 123076
-	Total	. a source to the contract of				110100	201410	THE COLUMN TWO IS NOT THE COLUMN TO THE COLUMN TWO IS NOT THE COLUMN TO THE COLUMN TWO IS NOT THE COLUMN TO THE COLUMN TWO IS NOT TH	Annual Miller ()		118188	201416
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nt/nerrigi	Total				en e						153	153
	rencia gelliformis	0.0 1.5 2.0 4.0	1100 12350 14050	173.30  165.00 280.00	138.00  53.00 141.44	1383 1947	342  2692 5921	3850	320.00	1232	39 1232 1383 1947	342 1232 2692
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4. Laui	rencia indica	0.0 0.5 1.0 1.5 2.0 4.0	7300 4650 2900 288412 366312 472475	51.66 51.66 76.66 239.30 152.91 95.00	32.30 22.30 45.72 85.00 40.30 29.30	141 137 90 44502 41250 31042	613 344 355 93532 70790 58278		 		141 137 90 44502 41250 31042	10187 613 344 355 93532 70790 58278
	Total	•			• .	*** **.	e e e e e e e e e e e e e e e e e e e			Company of the Compan	117162	224362

1. 2.	3	4		5	6	7	8	9 .	10	11	12	1 %
Laurencia	0.5	3150	145.00	72.25	223	691		_ == == == == == == == == == == == == ==		223	691	ين جين جين جين جين جين سن جين جين جين جين
paniculata	1.0	7250	200.80	133.00	491	24 20				491	2420	
	1.5	. 21800	557 <b>: 5</b> 0	351.00	4502	19805				4502	19805	
	2.0	401075	163.00	63.13	40055	90695	•		ara 404	40055	90695	
	4.0	98775	90.00	43.15	4628	13152	-	gangta 1986n	***	4628	13152	
Total					AND AND AND AND AND AND AND AND				en e saar e se	49899	126763	
. <u>Dictyurus</u>	0.5	erra visa			<b></b>		1850	20.00	37	37	37	
purpurescens	1.0	-5250	60.00	35.35	105	405				105	405	
· *	1.5	-			***		27950	10.00	279	279	<b>27</b> 9	
•	2.0	89550	122.50	45,88	6861	15078		<b></b> -	-+	6861	15078	
	4.0	967700	37.00	10.17	25963	45646				25963	45646	
Total	an gama gama ka saba saga					·.				33245	61445	
Grand Total									Specialities or design a company	1179231	3366922	S of the State Continues of the
	Total	of all sea	weeds :	(Total	productiv	e area 56	56.88 ha)		======	= <b>=====</b> 1576416	5299783	•

PK/

Marine Algal Survey in IV Sector 1974-75

Mainland between Punnakkayal (Tuticorin) and Cape Comorin (Kanyakumari)

Specieswise Estimated Standing Crop (tons fresh wt)

Group Spec	cies		ding crop
	••••••••••••••••••••••••••••••••••••••	Lower	Uppe: limit
1 2		limit 3	4
	ım micropterum	0.028	0.417
	opsis repens	0.816	0.816
,		1.787	3.710
	opsis variabilis	1.454	1.454
	aria compressa		55. 261
	aria corticata	23.525	
	aria crassa	0.005	0.005
	aria fergusonii	56.594	99.675
The state of the s	aria <u>foliifera</u>	4.651	9.347
9. <u>Hypnea</u>	<u>musciformis</u>	8.716	15.052
10. Hypnea	<u>spicifera</u>	0.109	0.109
11. Hypnea	<u>spinella</u>	0,853	0.853
12. Hypnea	<u>valentiae</u>	1.074	2 <b>.</b> 769
13. Gigart	ina acicularis	0.063	0.063
	Total	99.675	189.531
Alginophytes 1. Sargas	sum plagiophyllu	m 138.881	982.405
2. Sargas	sum vulgare	11.409	50.546
3. Sargas	sum wightii	134.967	683 <b>.73</b> 9
4. Sargas	sum sp.	12.253	26.640
1 . 1	Total .	297.510	1743.330
Other seaweeds 1. Entero	morpha intestina	<u>lis</u> 0.088	0.172
2. <u>Ulva f</u>	asciata	17.405	44.558
3. <u>Ulva</u> 1	actuca	0.409	0.809
4. Chaeto	morpha littorea	0.376	0.381
5. Chaeto	morpha torta	0.960	3.041
6. Cladop	hora fasciculari	s 0.574	0.965
and the second of the second o	hora uriculosa	2	0.100
*	morpha indica	1.259	20.063
	pa cupressoides	0 <b>.88</b> 0	1.963
•	pa fergusonii	35.071	91.998
	pa scalpelliform		34.635
	pa sedoides	0.454	0.475
	pa sertularioide		0.050
	coronatum	0.021	0.021
	da macroloba	4.633	10.946
	da opuntia	0.377	0.535
17. Halime		64.496	213.861
-		0.352	0.352
18. Udotes	<u>flabellum</u>	U.33Z	0.352

1	=		3	4
	19.	Valoniopsis pachynema	0.007	0.007
	20.	Dictyopteris delicatula	4.473	15.389
* 4 * 2	21.	Dictyota maxima	1.464	2.734
	22.	Dictyota dichotoma	0.013	0.013
	23.	Padina pavonica	0.030	0.030
	24.	Padina tetrastromatics	2.058	2.932
	25.	Pocockiella variegata	0.371	. 0.371
	26.	Spatoglossum asperum	218.539	582.995
	27.	Stoèchospermum marginatu	<u>ım</u> 13,718	52.419
	28.	Levringia borgensenii	4.298	8.861
• • • • • •	29.	Iyengaria stellata	0.030	0.030
	30.	Hormophysa triquetra	1.387	1.387
	31.	Liagora pulverulenta	0.136	0.136
	32.	Scinaia bengalica	0.486	0.486
	33:	Asparagopsis taxiformis	0.196	0.196
	34.	Chondrococcus hornemanii	0.311	0.311
en angele. Ngo angele	35.	Amphiroa anastromosans	32.943	154.380
	36.	Amphiroa ancepa	113.977	502,422
	37.	Amphiroa foliacea	1.217	1.217
			2.145	26.847
		Cheilosporium spectabile	19.073	37.530
No.		Jania adhaerens	0.644	1.109
		<u>Jania iyengaril</u>	0.840	0.840
		Cryptonemia coriacea		
		Grateloupia filicina		
		Grateloupia lithophils		
		Corynomorpha prismatica		
		Sarcodia ceylanica		
		Agardhiella robusta		
		Sarconema filiforme		
		Solieria indica		
		Cymnogongrus pygmaeus		
		Botryocladia leptopoda		
		Charmin opuntia		·
		Champia compressa		0.116
			0.166	0.347
	22.	Centroceras clavulatum	0.233	0.233

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1	2	3	4
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56.	Griffithsia tenuis	1.120	1.120
57.	Haloplegma duperrevi	0.511	0.511
58.	Wrangelia argus	0.334	1.087
59.	Acanthophora spicifera	0.076	0.076
60.	Chondria armata	0.650	1.000
61.	Enanthiocladia prolifer	<u>a</u> 198.879	436,690
62.	Laurencia ceylanica	0.153	0.153
63.	Laurencia flagelliformi	<u>s</u> 4.601	10.187
64.	Laurencia indica	117.162	224.362
. 65.	Laurencia paniculata	49.899	126.763
66.	Dictyurus purpurescens	33.245	61.445
			•
	Total	1179.231	3366.922
			-
	Grand Total	1576.416	5299.783

Table - 23

#### Marine Algal Survey in the IV Sector 1974-75

Mainland between Punnakkayal (Tuticorin) and Cape Comorin (Kanyakumari)

#### Groupwise estimates standing crop (tons fresh weight) and their percentage

Product- ive area hectares	Agarophytes		Alginophytes		Other seaweeds standing crop		-/	Total of all seaweeds standing crop		
	standing crop Lower Upper limit limit	%	standing crop Lower Upper limit limit	%	Lower limit	Upper limit	% .	Lower limit	Upper limit	
566.88	99.675 189.531	4.20	297.510 1743.330	29.70	1179.231	3366.922	66.10	1576.416	5299 <b>.</b> 783	

Table - 24

## Marine Algal Survey in the V Sector 1975-76 Mainland between Cape Comorin (Kanyakumari) & Melmidalam (Colachel)

Depthwise Estimated Standing Crop (Kg. fresh weight) Total Standing Under discrete distribution Under continuous distribution Crop Standing Mean den-Area Standing Crop Lower Upper Mean density sity  $(q/m^2)$ Depth Area Crop Upper sq.m. Lower Limit Limit Species  $(q/m^2)$  and No. sq.m. standard error Limit Limit 12. 10. 11. x + se 5. 17 17 Agarophytes 17 17 0.0 10.00 745 1700 241 Gelidiopsis repens 0.0 745 148.40 241 290.00 1700 910 285 0.0 Gracilaria corticata 910 60.10 285 115.00 26202 5200 18654 1.0 26202 106.00 18654 630.00 35600 27857 1.5 19180 Total 68 68 68 40.00 1700 612 0.0 612 Gracilaria fergusonii 612 180.00 3400 44 0.5 44 44 20.00 2200 724 1.0 724 Total 238 238 238 140.00 1700 0.0 Hypnea spinella 28836 20159 Grand Total 490 Alginophytes 342 490 47704 47704 Sargassum ilicifolium 1.0 1340.00 35600 1.5 48046 48194 Total

	2.	3.	_ 4.	5.	5. 5.	-	7.	8.	9,	10.	11:	12.
2.	Sargassum vulgare	0.5	-	-	<b>-</b> "	-	- "	3400	2290.00	7786		
		1.5	35600	290.00	21.21	9569	11079	-			7786	77
	Total				f • * (+)	#1. * 150	•	$\sqrt{e^{\pm}z_{\mu}}$		· • • • • • • • • • • • • • • • • • • •	9569	110
3.	Sargassum wightii	0.0	1700	380.00	28.28	598	694				17355	188
		0.5	-	-		- 350 	094	2400	<b>-</b>		598	. 6
	Total					*	- <b>-</b>	3400	540.00	1836	1836 -	18
	Grand Total						<b></b>				2434	25.
				<b>V</b>	j.						67835	695
	er Seaweeds		•						•			
1.	Ulva fasciata	1.0	-	. 📆	-		/	5200	160.00	832	832	8:
	mat - 1	1.5		-	- '	<b></b>		35600	40.00	1424	1424	14:
	Total										2256	
2.	Ulva lactuca	0.0	35250	125.00	85.68	1386	7426		·	_		
		0.5	-	-				3400	30.00	102	1386 : 102 :	
		· •								102		10
	Chaetomorpha antenni		3000	115.00	3.53	334	356	<b>-</b>			<u>1488</u> 334	752
4:	Caulerpa scalepelli- formis	0.5	3400	00.50					· · · · · · · · · · · · · · · · · · ·		334	35
5.	Valeniopsis pachynema		3400	22.50	1.76	71	82		-	• .	71	8
	The state of the s	2.0	<u></u>			· <del></del>	•	35600	680.00	24208	24208	2408
- 25	Total	2.0						62850	140.00	8799	8799	879
6.			n de la re Production de la companya			grande de la compansión Servición de la compansión de la compansión Transferencia de la compansión de la compa		ALAM TO ALAMA TO ALAMA			33007	_3300
	Dictyopteris delicate							3400	5.00	17	17	1
•	Levringia borgenseni	0.0	1700	85.00	43.74	270	219	••••••••••••••••••••••••••••••••••••••	•		70	7
e ,		0.5			-	••• · · · · · · · · · · · · · · · · · ·	<del>-</del> .	3400	10.00	34	34	34
			**			v.					104	25

1. 2.	3.	4	5		6.	7.	8	9.	10.	11	12.
COUNTY CO	1.0		•	. <del></del> .	· . , <del>-</del>	<u></u> .	5200	50.00	260	260	260
<ol> <li>Padina pavonica</li> <li>Pocockiella variega</li> </ol>	_	_	en e	-	•••	· -	62850	20.00	1527	1257	1257
10. Amphiroa anceps	0.0		. •••	-	•		1700	80.00	136	136	136
To. Ambition discord	0.5	·	· • •		-	-	3400	430.00	1462	1462	1462
	1.0	. • • • • • • • • • • • • • • • • • • •	. ••	-		-	2200	220.00	484	484	484
										2082	2082
			* · · · · · · · · · · · · · · · · · · ·		* 1				•	+ •	
11. Amphiroa fragili- ssima	1.5	·	-	•		<b>-</b>	35600	45.00	1602	1602	1602
12. Cryptonemia coriace		13000	62.50	40.65	284	1341	-	<b></b>	-	284	1341
13. Sarcodia ceylanica	0.5	***	-	-	-		3400	60.00	204	204	. 204
14. Botryocladia lepto-			. <b>-</b>	-	-		3400	10.00	34	34	34
poda			· ·				2200	10.00	22	<b>22</b> .	22
	1.0	•••			4064	0404		.10.00	-	1064	2121
	4.0	13000	122.50	40.65	1064	2121	•	- · · · · · · · · · · · · · · · · · · ·	<del>-</del> ,	1120	2177
<u>Total</u>			•				,			1120 pathon manager	2411
15. Emmtiocladia prol	<b>L-</b> 4.0	13000	30.00	17.67	160	620		•	•••	160	620
fera				· . <del>-</del>							
16. Centroceras clavul	_ 1.0	***	-		***	-	5200	40.00	208	208	208
atum		4 111 00	.,	00.00	670	706		_		670	796
17. Laurencia indica	0.0	1700	440.00	28.28	670	796		_	_	1471	<b>233</b> 6
	0.5	3400	560.00	127.20	1471	2336	2200	680.00	1496	1496	1496
	1.0	-	AND "		•	• • • • • • • • • • • • • • • • • • •	2200	000,00	1430	<u>3637</u>	
Total							F 2.00	490.00	2548	2548	<u>4628</u> 2548
18. Laurencia panicula	ta 1.0				•		5200	\$ *** <b>490.00</b> **	2340		
Grand Total	5 - vers	•					4 - 4			590639	€ • 426
		Tota	l of all	seaweed	s (To	tal prod	uctive are	ea 16.22	ha )	138633	158851

<u>Table - 25</u>

Marine Algal Survey in the V Sector 1975-76

Mainland between Cape Comorin (Kanyakumari) & Melmidalam (Colachel)

Species-wise Estimated standing crop(tons fresh weight)

Group	Species		ding crop	
		Lower limit	Upper limit	
Agarophytes	1.Gelidiopsis repens	0.017	0.017	
	2. Gracilaria corticata	19.180	27.857	
	3. Gracilaria fergusonii	0.724	0.724	
	4. Hypnea spinells	0.238	0.238	
	Total	20.159	28,836	
Alginophytes	1.Sargassum iliciforlium	48.046	48.194	
1	2. Sargassum vulgare	17.355	18.865	
•	3. Sargassum wightii	2.434	2,530	
	Total	67.835	69.589	
Other seaweeds	1.Ulva fasciata	2.256	2, 256	
	2. Ulva lactuca	1.488	7.528	
	3. Chaetomorpha antennina	0,334	0.356	
	4. Caulerpa scalpelliformis	0.071	0.082	
	5. Valoniopsis pachynema	33.007	33.007	
•	6.Dictyopteris delicatula	0.017	0.017	
•	7. Levringia borgesenii	0.104	0.253	T.
	8. Padina pavonica	0.260	0.260	
	9. Pocockiella varieqata	1.257	1.257	
	10.Amphiroa anceps	2.082	2.082	
	11.Amphiroa fragelisima	1.602	1.602	
	12.Cryptonemia coriacea	0.284	1.341	
	13.Sarcodia ceylanica	0.204	0.204	
	14.Botryocladia leptopoda	1.120	2.177	
	15. Centroceras clavulatum	0.208	0.208	
	16.Enantiocladia prolifera	0.160	0.620	
	17. Laurencia indica	3.637	4.628	
	18. Laurencia paniculata	2.548	2.548	
	Total	50.639	60,426	•
•	Grand Total	138.633	158.851	

Table - 26

#### Marine Algal Survey in the V Sector 1975-76

### Mainland between Cape Comorin (Kanyakumari) & Melmidalam (Colachel)

### Groupwise Estimated Standing Crop (tons fresh weight) & their percentage

Productive area hectares	Agarophytostanding of Lower Unit 1	es crop pper imit	%	Alginoph standing Lower limit	nytes g crop Upper limit	%	Other se standing Lower limit	rcrop Upper limit	%	standin Lower limit	Upper limit
	·	· • · · · · · · · · · · · · · · · · · ·	, ~ , ~	•		··· • ··· • ··· • ··· • ···		,,,,		. ··· . · . · . · . · · · · · · · · · ·	. <del>-</del>
16.2200							50.639	60,426	37.33	138,633	158,851

Table - 27

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Marine Algal Survey in the Five Sectors 1971 -76

Mainland between Thonithurai (Mandapam) and Melmidalam (Colachel) and the Off-shore Islands in the Gulf of and the Ma inland between Rameswaram and Athankarai in the Palk Bay Groupwise Estima ted Standing Crop (tons fresh weight) together Mean Tipner Agarophytes Tower Productive Mpper Place Lower Sector Upper Mean Lower Jamit Mean Lower Upper To area ha. limit Number\_From limit limit limit limit I.Thonithurai (Mandapam)to 1079.204 Kilakkarai 1015-493 273.949 4066.985 1713.3500 Mainland 804,504 4356.2737 Island 1996-711 1103.864 102.030 Rameswaram to 2346.1900 7143.100 8998.357 Athankarai 1180.483 8415.8137 Total II.Kilakkarai to 448:409 Mukkaiyur 66:521 24:973 47:157 6:341 1.13.178 167.4500 2827371 Mainland 122.403 106.985 121.057 136.726 1083389 131.611 223.242 177.427 555.1000 Island 512.424 160.442 400.167 621.680 168.214 131.958 188.924 136.640 230.896 183.768 131.569 204.860 Total

				no venezio i mandicinarionali ind	and the same of th		era i Larra da de		The second secon	1916 - Albert Miller I. W. gerejers swampe	and consists a second statement and a second se		47.	106
1	2	3.	4	5	6	7	8	9	10	11	12	13	121	15
III.Muki	kaiyur to	14	٠										The state of the s	etti tii maatalaan kii valkaalaanaanaa — e kii e kulaa
	nakkayal				• ,	•				* S	. ••	1 3 2 1 1 1	,	Programme and a second
Mai	n-land	62:6425	0:878	5:086	2:982	0.096	0:096	0:096	238:132	299:276	268:704	239:106	304:458	<b>244:</b> 782
Isl	ands 🐔	<b>107.</b> 2620	95.668	249.675	172.671	9.901	<b>9.9</b> 01	9.901	107.177	229.454	168.315	212.746	489.080	<b>35</b> 0.888
	Total	169.9045	96 <b>.</b> 546	254.761	175.653	9.997	9.997	9.997	345.309	528.730	437.019	451.852	793.488	622.609
V. Cape	Comorin	566.8800 to				67.835		68.712	50.639	60.426	55.532	138.633	158.851	148.742
(Cola	cuer)	16.2200	5 200 m	20.030	£4.47[	01.035		00.712		OU • μω ο		170 • U.J.)	1 <b>)(****)</b> (***)	ALA 1 • 122A
Grand	n Total	9894.3682					Kor Bus		15. and the second of the seco	to the second of	10069.169			22073.84
		· 9892 hecta	res <sub>error</sub>		1709 tons		740.	10266 ton	<b>15</b> ,		10069 ton	<b>15</b>	Sept. Mass.	22011 +

Groupwise Estimated Standing Crop (tons fresh weight) and their percentage combined for Mainland & Islands

THE	TCOSHOR		II Sect		iii-s	ector_	IV Sec		V Secto	AND REAL PROPERTY.	Total	Group-
Group	I Sector Standing Crop	%	Standing Crop		Standing Crop		Standing Crop	%	Standing Crop	%	Standing Crop	wise percen- tage of
1.	2.	3.	4.		6.	7	8	_9	10.	11.	12. 1	the stotal
Agarophytes	1180.483	69.074	183.768	10.753	175.653	10.278	144.603	8.461	24.497	1.433	1709.004	7.75
Alginophytes	8998.357	87.654	168.214	1.63	9 <b>.9</b> 97	0.097	1020.420	9.940	68.712	0,669	10265.700	46.57
Other Seaweeds	7143.100	70.940	160.442	1.593	437.019	4.340	2273.076	22.575	55.532	0.551	10069.169	45.67
Total	17321.940	78.579	512.424	2.325	622.699	2.825	3438.099	15.596	148.742	0.675	22043.873	

ant kan ang tipak ang mga banggalang kan ang mga panggalang tipak at panggalang kan dibanggalang ang banggalan Tanggalang

Percentage of water loss in some Marine Algae

Seaweed	Fresh	Dry w		Percentage o	
	Weight	Sun dried	Oven dried	Sun dried	Water dried
Agarophytes					· · · · · · · · · · · · · · · · · · ·
1. Gelidiella acerosa	300	80.5	74.0	73.1	75.3
2. Gracilaria edulis	200	34.0	33.0	83.0	83.5
3. Gracilaria crassa	200	<b>17.</b> 5	16.0	91.2	92.0
4. Gracilaria corticata	250	39.0	36.5	84.4	85.4
5. Gracilaria foliifera	200	35.1	32.7	82.5	83.5
6. <u>Hypnea</u>	200	26.5	25.1	86.7	87.4
Alginophytes					
1. Sargassum spp.	200	30.6	28.5	84.7	85.7
2. Sargassum mefiocytum	100	19.0	17.2	81.0	82.8
3. Turbinaria conoides	200	28.0	24.5	86.0	87.7
4. Turbinaria ornata	200	34.0	33.15	83.0	83.4
5. Turbinaria decuneus	200	33.5	30.0	83.4	85.0
6. Cystoseira sp.	200	35.0	33.5	82.5	83.4
Other Seaweeds					
1. Ulva reticulate	200	36.0	34.10	82.0	83.0
2. Caulerpa racemosa	200	10.0	8.50	95.0	95.7
3. Caulerpa peltata	200	17.0	14.90	91.5	92.5
4. Caulerpa spp.	300	20.5	19.50	93.2	93.5
5. Codium sp.	200	21.0	20.50	89.5	89.7
6. Padina sp.	200	32.8	30.6	83.6	83.7

		Dry wt.		Percentage of w	ater loss
Scaweed	Fresh	Sun dried	Oven dried	Sun dried	Water dried
Other seaweeds	adas destr unit unte com unte com dies des abs ab				
7. Laurencia spp.  8. Halimeda macroloba  9. Halimeda gracilis  10. Pocockiella variegata  11. Amphiroa foliacea  12. Chondris armata  13. Chondrococcus hornemar	100 300 200 100 200 70	18.5 47.5 64.0 21.5 - 8.5 18.0	17.5 39.00 59.90 19.50 62.00 7.5 16.3	81.5 84.2 68.0 78.5 - 87.9 82.0	82.5 87.0 70.1 80.5 69.0 89.3 83.7

Analysis done by the Central Marine Fisheries Research Institute.

Marine Algal Survey in the Five Sectors 1971-76 Sectorwise Estimated Standing crop (tons fresh weight) together with the area (ha), and their percentage.

Sectors		Productive area ha.	%	Standing crop	%	
I		8416	49.14	17322	<b>7</b> 8 <b>.</b> 58	
II		1826	10.66	512	2.32	
III		4552	26.58	623	2.82	
IV		1732	10.11	3438	15.60	
v ·		599	3.50	149	0.68	
	To <b>t</b> al	17125		22044	C 21 — — 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	

<u>Table - 31</u>

## Marine Algal Survey in the I-Sector 1971-72 Profile gradients of the area

Area		Range o	Slope f the depth in		
	0.0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0	2.0 to 4.0
Mainland between Mandapam (Thonithurai) to Kilakkarai	1:28	1:44	1:54	1:216	1:111
Mainland between Rameswaram to Athankarai	1: 116	1:73	1:58	1:173	1:161
<u>Islands</u>					
Single Island	1:16	1:25	1:54	1:268	1:636
Krusadai Island	1:153	1:429	1:42	1:12	1:175
Pulli, Pullivasal Island	1:182	1:204	1:128	• • • • • • • • • • • • • • • • • • •	1:84
New Island	1:794	1:1442	1:28	1:260	1:620
Manoli Island	1:188	1:210	1:84	• • • • • • • • • • • • • • • • • • •	
Hare Island	1:40	1:270	1:250 ,	1:380	1:1314
Mulli Island	1:18	1:516	1:474	1:156	1:24
Vali Island	1:266	1:52	1:182	1:997	1:115
Appa Island	1:326	1:94	1:258		<b></b>

Marine Algal Survey in the II Sector 1972-73

Profile gradients of the area

Area		in m.	$m_{ullet}$		
	0.0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0	2.0 to 4.7
Mainland	1:50	1:60	1:42	1:88	14216
Jpputhanni Island	1:10	1:16	1:96	1:16	1:14
Shuli Island	1:26	1:52	1 <b>:</b> 8	1:10	1:10
Wallathanni Island	1:18	1:10	1:224	1:44	1:27
Manaiparai Island	1:118	1:78	1:56	1:4	1:25
Palaiayamunai Island	1:10	1:18	1:82	1:498	1:101
Jandamukhi Island	1:22	1:14	1:6	1:6	1:8

Table - 33

## Marine Algal Survey in the III Sector 1973-74 Profile gradients of the area

Area	•	SlopeRange of the depth in m.							
	0.0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0	2.0 to 4.0				
Mainland	1:34	1:164	1:112	1:300	1:361				
Karaya Island	1:26	1:26	1:64	1:68	1:92				
Chally Island	1:20	1:26	1:60	1:36	1:13				
Van Island	1:14	1:22	1:80	1:16	1:118				

#### Table - 34

## Marine Algal Survey in the IV Sector 1974-75 Profile gradients of the area

114

#### Slope

	Range of	f the depth in	m.	
0.0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0	2.0 to 4.0
appearance and are one one are one one or one	و هوي هيد ميش هلك ولاي جادة جده بحيد بديد الآن عاد، ديد الآن الآن	the first field year from your date every toda year toda year date of	الله وين فيود وين ماكا فياد ويده الله عالي الله الله الله الله الله الله الله ا	
1:10	1:24	1:30	1:72	1:69

#### Table - 35

## Marine Algal Survey in the V Sector 1975-76 Profile gradients of the area

	Range of	Slope the depth in	m <b>.</b>	
0.0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0	2.0 to 4.0
1:40	1:32	1:46	1:234	1:57

#### Marine Algal Survey in the II Sector 1972-73

## List of Marine Algae collected together with their occurrence as continuous, discrete or rare

Sr. Species	Ma	ainland	1			Islan	<del></del>
No.	С	D	R	I	C	D D	R
CHLOROPHYTA							
<u>Ulvaceae</u>		"	4				İ
1. Enteromorpha compressa	+	e ta la					
2. <u>Ulva lactuca</u>				Ť			+
3. <u>Ulva reticulata</u>						+	
Cladophoraceae				Ī			
4. Chaetomorpha littorea			+	•			
5. Chaetomorpha antennina							+
Caulerpaceae		50.	1				
6. Caulerpa cupressoides		1	+	<b>!</b>			į
7. Caulerpa sertularioides	10			-		4	
8. <u>Caulerpa racemosa</u>			Managar A		+	+	ž.
9. Caulerpa scalpelliformis		+		-		+	
10. Caulerpa peltata		+	sa <sup>2</sup>				
11. Caulerpa taxifolia		, +					
<u>Codiaceae</u>							
12. Codium tomantosum		-			:	+	
13. Codium dwarkense						Ŝ	+
14. Halimeda gracilis			energia esta apparatura de la properción d	•	+	+	
15. Halimeda macroloba			Market Market (print) - Nagaranga Control		The state of the s	Andrew State of the Contraction	+-
Udotea flabellum	n is and party on advance for	+	eligi je kanamat ser mengejan Visig	-	-	+ "	-
Va oniaceae							•
17. Anadyomene stellata							+
18. Microdictyon tenuis	+						
19. Valoniopsis pachynema		+		<del> </del>			
РНАЕОРНҮТА		<b></b>		$\vdash$			
Sphacilariaceae			<b>t</b>				
20. <u>Sphacilaria</u> <u>furcigera</u>	•	+					
<u>Dicty</u> otaceae							The second secon
21. Dictyota dichotoma	+					+	:
	1		i e				

Sr.   Species   Mainland   Telend	•					. •		
No.   C   D   R   C   D   R								
No.   C   D   R   C   D   R							el and	
23. Padina pavonica 24. Padina tetrastromatica 25. Pocockiella variegata 26. Stoechospermum marginatum 27. Zonaria variegata 28. Zonaria crenata 29. Colpomenia sinuosa 30. Hydroclathrus clathratus Chnoosporaceae 31. Chnoospora implexa Cystoseiraceae 32. Cystoseira trinodis Sargassum wightii + + + + + + + + + + + + + + + + + +	The state of the s	С	D		1			R
24. Padine tetrastromatica	22. <u>Padina gymnospora</u>	i	+	1	-	+	+	
25. Pocockiella varieqata	23. Padina pavonica			1			+	
26. Stoechospermum marginatum  27. Zonaria variegata  28. Zonaria crenata  Punctuariaceae  29. Colpomenia sinuosa  30. Hydroclathrus clathratus  Chnoosporaceae  31. Chnoospora implexa  Cystoseiraceae  32. Cystoseira trinodis  Sargassum vightii + + +  34. Sargassum plagiophyllum + + +  35. Sargassum sp.  36. Sargassum swartzii + +  37. Sargassum swartzii + +  38. Turbinaria conoides + +  40. Turbinaria sp.  RHODOPHYTA  Gelidiaceae  41. Gelidium micropterum  Gelidiaceae  42. Gelidiella acerose + + + + +  43. Gelidiella sp.  Rhizophyllidaceae  44. Chondrococcus hornemanii  Corallinaceae	24. Padina tetrastromatica			1		+	+	
27. Zonaria variegata 28. Zonaria crenata  Punctuariaceae 29. Colpomenia sinuosa 30. Hydroclathrus clathratus  Chnoosporaceae 31. Chnoospora implexa  Cystoseiraceae 32. Cystoseira trinodis  Sargassaceae 33. Sargassum wightii + + +  34. Sargassum plaqiophyllum + +  35. Sargassum sp. 36. Sargassum swartzii + +  37. Sargassum swartzii + +  38. Turbinaria ornata + + + +  39. Turbinaria conoides +  40. Turbinaria sp.  RHODOPHYTA  Gelidiaceae 41. Gelidium micropterum  Gelidiaceae 42. Gelidiella acerosa + + + +  43. Gelidiella sp.  Rhizophyllidaceae  44. Chondrococcus hornemanii + +  Corallinaceae	25. <u>Pocockiella</u> variegata	+	1	+	+	+	+	-
28. Zoneria Crenata	26. Stoechospermum marginatum	<u></u>	Name of the same of	.,	+	+	+-	<del> </del>
Punctuarisceae  29. Colpomenia sinuosa  30. Hydroclathrus clathratus  Chnoosporaceae  31. Chnoospora implexa  Cystoseiraceae  32. Cystoseira trinodis  Sarqassaceae  33. Sargassum wightii + + + + + + + + + + + + + + + + + +	27. Zonaria variegata	-	-	-	+-		+	
29. Colpomenia sinuosa  30. Hydroclathrus clathratus  Chnoosporaceae  31. Chnoospora implexa  Cystoseiraceae  32. Cystoseira trinodis  Sarqassaceae  33. Sargassum wightii + + + + + + + + + + + + + + + + + +	28. Zonaria crenata	+		+	-			<del> </del>
29. Colpomenia sinuosa  30. Hydroclathrus clathratus  Chnoosporaceae  31. Chnoospora implexa  Cystoseiraceae  32. Cystoseira trinodis  Sarqassaceae  33. Sargassum wightii + + + + + + + + + + + + + + + + + +			en a ja i valenesse	<b></b>	-		<b> </b>	<b> </b>
30. Hydroclathrus clathratus						+	+	
31. Chnoospora implexa		<b> </b> -	+	<b>_</b>			+	
31. Chnoospora implexa	Chroosporaceae			<u> </u>	1			
Cystoseiraceae         32. Cystoseira trinodis         Sarqassaceae         33. Sargassum wightii       +         34. Sargassum plagiophyllum       +         35. Sargassum sp.       +         36. Sargassum ilicifolium       +         37. Sargassum swartzii       +         38. Turbinaria ornata       +         40. Turbinaria conoides       +         40. Turbinaria sp.       +         RHODOPHYTA       Celidiaceae         41. Gelidium micropterum       +         Gelidiella ceae       +         42. Gelidiella sp.       +         Rhizophyllidaceae       +         44. Chondrococcus hornemanii       +         Corallinaceae       +							+	
32. Cystoseira trinodis  Sarqassaceae  33. Sargassum wightii	Control of the Contro		-		<b> </b>			
33. Sargassum wightii		3.					+	
34. Sargassum plagiophyllum + + + + + + + + + + + + + + + + + + +	Sargassaceae				-			
35. Sargassum sp.  36. Sargassum ilicifolium +	33. Sargassum wightii	+				+	+	
36. Sargassum ilicifolium +	34. Sargassum plagiophyllum	+	+				+	
37. Sarqassum swartzii + + +   38. Turbinaria ornata + + + + + +   39. Turbinaria conoides +   40. Turbinaria sp. +   RHODOPHYTA Gelidiaceae 41. Gelidium micropterum Gelidiellaceae 42. Gelidiella acerosa + + + + +   43. Gelidiella sp. +   Rhizophyllidaceae 44. Chondrococcus hornemanii + + + + +   Corallinaceae	35. Sargassum sp.		- A		-	`	+	
38. Turbinaria ornata + + + + + + +   39. Turbinaria conoides +	36. Sargassum ilicifolium	+					1 12	
39. Turbinaria conoides +  40. Turbinaria sp. +  RHODOPHYTA Gelidiaceae 41. Gelidium micropterum +  Gélidiellaceae 42. Gelidiella acerosa + + + +  43. Gelidiella sp. Rhizophyllidaceae 44. Chondrococcus hornemanii + +  Corallinaceae	37. <u>Sarqassum</u> swartzii				-	+	+	
40. Turbinaria sp. +  RHODOPHYTA  Gelidiaceae  41. Gelidium micropterum +  Gélidiellaceae  42. Gelidiella acerosa + + + + +  43. Gelidiella sp. +  Rhizophyllidaceae  44. Chondrococcus hornemanii + + +  Corallinaceae	38. Turbinaria ornata	+	+	and the second	. <u> </u>	+	+	
RHODOPHYTA Gelidiaceae 41. Gelidium micropterum  Gélidiellaceae 42. Gelidiella acerosa + + + + + + + + + + + + + + + + + + +	39. Turbinaria conoides	-,	+					
RHODOPHYTA Gelidiaceae 41. Gelidium micropterum  Gelidiellaceae 42. Gelidiella acerosa + + + + + + + + + + + + + + + + + + +	40. Turbinaria sp.							+
41. Gelidium micropterum  Gélidiellaceae  42. Gelidiella acerosa + + + + + + + + + + + + + + + + + + +	RHODOPHYTA					No.	1 1	
Gélidiellaceae  42. Gelidiella acerosa + + + + + + + + + + + + + + + + + + +	Gelidiaceae							
42. Gelidiella acerosa + + + + + + + + + + + + + + + + + + +							•	+
43. Gelidiella sp. +  Rhizophyllidaceae  44. Chondrococcus hornemanii + +  Corallinaceae		+	+	-			+	
Rhizophyllidaceae  44. Chondrococcus hornemanii + + +  Corallinaceae					70 - 1 1 (1) - 1			+
44. Chondrococcus hornemanii + + + Corallinaceae	And the second s	-						
	•		2+				+	
45. Amphiroa fragillissima + + +								
46. Jania adhaerens +		+				+	+	

Sr. Species		Mainl	and		Islan	đ
No.	C	D	R	C	D	R
<u>Gracilariaceae</u>						
47. Gelidiopsis repens	+					
48. Gelidiopsis variabilis			+			
49. Gracilaria corticata	+	1+			+	
50. Gracilaria debilis	+	+			ļ	
51. Gracilaria crassa					+	
52. Gracilaria dura			+			
53. Gracilaria folifora					+	
54. Gracilaria edulis					+	
55. Gracilaria verrucoss			+			
56. Gracilaria fergusonii			+	· ·		
57. Gracilaria sp.					+	
Hypneaceae		<u> </u>				
58. Hypnea musciformis		+		+	· +	
59. Hypnea walentiae				+	+	
60. Hypnea pannosa				+	+	
61. Hypnea nigrescens			+			
Lomenatariaceae						e a
62. Champia parvula	. 1857 - 144 1 175	+				
63. Champia compressa			+			
Ceramiaceae		1.00 m				•
64. Centroceras clavulatum		+			+	-
65. Ceramium minatum		+				
66. Ceramium sp.		+			* :	
67. Soyridia insignis		Garage Const				+
68. Halophlegma duperrevi						+
Rhodomalaceae						
69. Acanthophora spicifera					+	
70. Lenormandiopsis parthas	sarathii					+
71. Laurencia papillosa					+	
72. Laurencia indica			+		property of magnetic control	+
73. Laurencia paniculata					+	Fr
CYANOPHYTA, Oscillatoriaces	e					
74. Lyngbya majuscula				1	+	

C = Continuous at any depth zone.
D = Discrete at any depth zone.
R = Rare, not entering into the estimates.

#### Marine Algal Survey in the III Sector 1973-74

## List of Marine Algae collected together with their occurrence as continuous, discrete or rare.

Sr. Species			land		sland	1
No.	C	D	R	C	D	R
CHLOROPHYTA	, .					
Ulvaceae						i i t
1. Enteromorpha prolifera	***	+ ,				+
2. Ulva lactuca		7)	+			
3. <u>Ulva reticulata</u>			+			
Cladophoraceae						
4. Chaetomorpha antennina		<del></del>	+	-		
5. Chaetomorpha littorea	+	- <b>+</b>				+
6. Cladophora fascicularis	***************************************	+				+
Caulerpaceae	·				<del></del>	
7. Caulerpa cupressoides						
8. Caulerpa scalpelliformis	+	+		+		
9. Caulerpa sertularioides	e e e e e e e e e e e e e e e e e e e	+ '				
10. Caulerpa racemosa						
Dasycladaceae					<b> </b> -	
11. Neomeris annulata		,				
						+
Codiaceae	·			•		
12. <u>Halimeda macroloba</u>		+		Arr s	+	
13. <u>Halimeda gracilis</u>					<b>i</b> Ngar	
14. <u>Udotea flabellum</u>		+				
Valoniaceae		á vo	And the same			
15. Microdictyon tenuis						
Literoarceyon cenuis		ju daži i				
PHAEOPHYTA					<u> </u>	
Dictyotaceae		3				
16. <u>Dictyota bartayresiana</u>					+	
17. Dictyota dichotoma			+			+
18. Dictyota maxima	To the state of	- 22-5			+6	·

	Sr. Species				nland		slan	<u>d</u>
•	No.		С	D	R	C		R.
	19. Padina gymnospora	<b></b> -		+		+	+	
-	20. Padina tetrastromatica			+-				
	21. Pocockiella variegata		+	+	a second			<b>–</b>
À	22. Spatoglossum asperum			+		1		
1	Punctuariaceae					[]	7	
	23. <u>Colpomenia sinuosa</u>							+
	Chnoosporaceae		T				<del> </del>	<u> </u>
	24. Chnoospora implexa							+
	Cystoseiraceae							
	25. Cystoseira trinodis	_					+	
1.	Sargassaceae			T		-f=-=	<b>†</b>	
	26. <u>Sargassum wight1i</u>			+			+	
•	RHODPHYTA		·	<b> </b> -	+	<b>+</b>		<u> </u>
	Corallinaceae		• <del> </del>			and the second of the second o		
	27. Amphiroa fragilissima		·.		_+			
-	28. <u>Jania adhaerens</u>	]	+	+				
	Gelidiaceae							
	29. Gelidium micropterum	: -						4
-	Grateloupiaceae				<u> </u>	<b> </b>		
	30. Grateloupia filicina		+					+
	Gracilariaceae				<del> </del>			
L	31. <u>Gelidiopsis repens</u>			+	<i>a</i>			
-	32. <u>Gelidiopsis variabilis</u>			+		1,111		
	33. Gracilaria corticata		+	+			* 1	+
	34. Gracilaria crassa			**************************************				
	35. Gracilaria edulis	+	+	<u>, *</u> ≈, <b>+</b>	<u>.</u>	+	+	th - 1
_	36. Gracilaria foliifera	+		+			+	
	37. <u>Gracilaria verrucosa</u>	+						+
	Solieriaceae							
:	38. Sarconema filiforme		* ···	+			+	
	39. <u>Solieria robusta</u>	+	+				+	
	Hypneaceae							
	40. <u>Hypnea musciformis</u>		_			+	+	
	41. Hypnea pannosa	T		1			+	
	42. <u>Hypnea valentiae</u>	_		+		+	+	1
				* ** *******				

Sr.	Species	M	ainlan	d		Is	sland	
No.		С	D	R		С	D	R <sub>.</sub>
Lome	entariaceae							
43.	Champia compressa						•	+
44.	Champia parvula		+					+
Cer	amiaceae							
45.	Centroceras clavulatum		+			,		+
46.	Spyridia insignis	+	+				<b>. क</b>	
							[	
Rhc	odomelaceae					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
47.	Acanthophora spicifera		<del>-}</del>		  -  -			
48.	Chondria armata	+						
49.	Herposiphonia stuposa	·	+					
50.	Laurencia nana		+					
51.	Laurencia papillosa		+ .					+
				<b>.</b>			<b></b>	
CY	ANOPHYTA							
Osc	cillatoria <b>ce</b> ae							
52.	. Lyngbya majuscula		+					
1		<u> </u>		<u> </u>	<u>!</u>			1

#### N.B. :-

C = Continuous at any depth zone

D = Discrete at any depth zone

R = Rare, not entering into the estimates

## Marine Algal Survey in the IV Sector 1974-75 List of Marine Algae collected together with their occurrence as continuous, discrete or rare

No.  Chlorphyta  Ulvaceae  1. Enteromorpha flexuosa	C	D	R
Ulvaceae			
Ulvaceae			
	مع منتقل أن المحاصلة المحاسبة		
			+
2. Enteromorpha intestinalis			
3. Enteromorpha prolifera	a de la companya de l		+
4. Ulva fasciata	<u> </u>	A A CONTRACTOR OF THE CONTRACT	
5. <u>Ulva lactuca</u>			
Cladophoraceae			
6. Chaetomorpha littorea	+	+	
7. Chaetomorpha torta	+	the second of th	
8. Cladophora fascicularis	+	+	man i an
9. Cladophora utriculosa		+	
10. Cladophora sp.			+
11. Spongomorpha indica	+ +	+	The second secon
<b>Protosiphonaceae</b>	and the second second		
12. Caulerpa cupressoides		+	* * *
13. Caulerpa fergusonii			
14. Caulerpa scalpelliformis	+	+	Andrew Control of the
15. Caulerpa sedoides	+	+	garages and annual serve and
16. Caulerpa taxifolia		and the second s	+
17. Caulerpa sertulariodes		+	
	and the same of th	and the second s	
Codiaceae		.•	The second secon
18. Codium coronatum			
19. Halimeda macroloba	+	+ 1	
20: Halimeda opuntia		+	
21. Halimeda tuna	• · · · · · · · · · · · · · · · · · · ·	+	
22. Udotea flabellum		+	
Valoniaceae			
23. Valoniopsis pachymema		+	e Service en legel
РНАЕОРНҮТА		and the second of the second o	
Dictyotaceae			
24. Dictyopteris delicatula	· +	+	
25. Dictyota bartayresiana			+
26. Dictyota dichotoma		- 11 (1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
27. Dictyota maxima	+	+	
a secoyoon manama			1
		and the second s	r en

Sr. Species No.	c	Mainland D	R
28. Padina pavonica		+	
29. Padina tetrastromatica	+		
30. Pocockiella variegata		+	Service Services
31. Spatoglossum asperum	+		
32. Stoechospermum marginatum	+ -	The second secon	and the second s
33. Zonaria variegata		1	
<u>Chordariaceae</u>			Confidence of the Confidence o
34. <u>Levringia borgensenii</u>	+	<u> </u>	
Panctariaceae			
35. <u>Colpomenia</u> <u>sinuosa</u>		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
36. <u>Iyengaria stellata</u>		+	
Chnoosporaceae			
37. Chnoospora implexa			
	<b></b>		
Cystoseiraceae			
38. Hormophysa triquetra		+	
Sargassaceae			
39. Sargassum conorium			
40. Sargassum ilicifolium			
41. Sargassum plagiophyllum	*********		
42. Sargassum vulgaro			The State of the Control of the Cont
43. Sargessum wightii	<del></del>		Language of the same of the same
44. Sargassum sp.	+	+	
RHODOPHYTA			
Helminthocladianeae	<b>1</b>		
45. Helminthocladia sp.			+
46. Liagora pulverulenta	<del> </del>		
Chaetangiaceae			
47. Scinala bengalica		+	
48. Scinaia cornosa			+
	<b></b>		
Bonnemaisoniaceae	•		
49. Asparagopsis taxiformis		+	
	.}		
<u>Gelidiaceae</u>			
50. Gelidium heteroplatos			
51. Gelidium micropterum	+		
52. <u>Gelidium pusillum</u>	1 2 2		

And the second s		 M	ainl	and			
and the season was not seen to see the season who was seen to see the season to sea the season to see	C		D		, F		
Sr. Species	L						
NO.					1		
	1				1 -	+	
Gelidiellaceae							
53. <u>Gelidiella</u> indica	+		7 7000			1	
				+			
Rhizophy lidaceae hornemanii			-+	همد منو مد مد سد			•
Rhizophy Illaaceas  54. Chondrococcus hornemanii							
		+		+			
55. Amphire anastromosans		Ŧ	1	+			
56. Amphilioa enceps			-+-	+			į
57. Ampairos Elliacea				+			1
57. Amprilroa			-+-	+			
57. Amphrioa fragilissima 58. Amphrioa fragilissima spectabile							
to Cheilosporum spes		<b>- -</b>					
co Jania adhaerens							-†
61. Jania ivengarii							
	- 1			<b>.</b>			
Grateloupiaceae acriacea		+				+	
co Cryptonemia College							
bonomid buy	<del>\</del>					and the second of the second	_
				+		in the second of	
haloupia Illicii							
65. Grateloupia Iithophila 66. Grateloupia Iithophila						+	
66. Grateloupza		ļ		+	·		
67. Halymenia dubia	To the						
Corynomorohaceae	,	1	+	1 - 4	•		=+
68. Corynomorpha prismatica			,		~-		
					L		. = .
Gracilariaceae		1			+	_+-	
- in a repend		1	<u>.</u> ļ.		+		
1 dionsis Varia		-	+				4
anilaria Colo		-	<del>-</del>	-	+		
Gangilaria Tergus			+	-+-	+		-
73. Gracilaria foliifera							+ 1
73. Graciiai is verrucosa			،		+		
74. Gracilaria verrucosa					+		
74. Gracilaria compressa 75. Gracilaria compressa					نيات سيسان		
76. Gracilaria crassa		1		•	ا العالم الم العالم الما العالم الما الما الما الما ا		۱۹۳۵ کې د د د د د د د د د د د د د د د د د د
					+		
Sarcodiaceae		+	***		· · · · · · · · · · · · · · · · · · ·		
77. Sarcodia ceylanica					· · ·		
						· · · · · · · · · · · · · · · · · · ·	
Solieriaceae			-	<b>+</b>	+		
a and hiella robusos			1-	+	+		1
Garconema IIIII			+-		1		1
a sonema lliure			1		1		1
81. Sarconema furcellatum				+	1	-	
81. Sarconello Islandica 82. Solieria indica			!				

Sr. Species No.		Mainland	
110.	С	D	R
Hypneaceae		T	
83. Hypnea flagelliformis			
84. Hypnea musciformis	+	+	+
85. Hypnea pannosa			
.86. Hypnea servicornis		and the second s	+
87. Hypnea spinella			+
88. Hypnea valentiae	+		
89. Hypnea spicifera	7	+	
و الله الله الله الله الله الله الله الل			
Phyllophoraceae			
90. Gymnogongrus pygmaeus	· ·	+	
91. Gigartina acicularis		+	
Rhodymeniaceae			
92. Botryocladia letopoda	+	The second of th	
93. Coelarthrum opuntia	.+		
94. Coelarthrum sp.	100 M		+
Lomentariaceae			
95. Champia compressa		1. 1.	
96. Champia parvula	<del>                                     </del>		
Ceramiales			
			and the second s
97. Centroceras clavulatum 98. Ceramium moryae	•	+	
	10 mm		+
<u> </u>		+	The second secon
00. Wrangelia argus	+	+	
01. Griffithsia tenuis		+	
Rhodomelaceae	•		
102. Acanthophora spicifera		+	
103. Chondria armata	+	+	
104. Enantiocladía prolifera  105. Laurencia ceylanica	+		
<u> </u>		+	
106. Laurencia flagelliformis	+ !	+	
107. Laurencia indica	+		2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
108. Laurencia paniculata			
Dasyaceae			
109. Dictyurus purpurescens		+	
YANOPHYTA			
Oscillatoriaceae			
10. Lygnbya majuscula		44 - 44 - 44 <del>- 4</del>	į

Marine Algal Survey in the V Sector 1975-76

List of Marine Algae collected together with their occurrence as continuous, discrete or rare

Sr. Species		Mainland		
NO.	U	Q	K.	
CHLOROPITYTA				<b>†</b>
Vaceae				
Ulva		* <b>+</b>		
2. Ulva lactuca	+	+		T
				+
3. Chaetomorpha antennina	+			-
ulerpaceae				
i	+			-
5. Caulerpa sedoides				
Codiaceae				
6. Halimeda gracilis		<b>10</b> Tarakan ang ang ang ang ang ang ang ang ang a	+	~ -
			The second secon	
7. Valoniopsis pachynema		+		
PHAEOPHYTA				.,
O				
- 1		+		
٠,	Andrew Company of the	+		
10. Pocockiella variegata	The same of the sa	+		
1			The second secon	
111. Levringia borgensenii	+	+		
Chnoosporaceae			+	
12. Chnoospora implexa		2	+	1.1
caceae				:
Sargassum	+	+	. 11	-71
Sargassum	.+	+	Marin Company of the	*
15. Sargassum wightii	+	+		
idiaceae				
Gelidium			+	
1/. Gelidium micropterum			+	
Corllinaceae				
	Middle Advisor via gala.	+	•	
19. Amphiroa fragilissima		+		
o cuellosporum spectabile			+	

Marine Algal Survey in the II Sector 1972-73

Relative abundance of substrate, cover, standing crop and density

-0-0-0-0-0-0-0	0-0-0-0-0-0-0-	0-0-0-0-	0-0-0-0	-0-0-0-0-	-0-0-0-0-	0-0-0-0-0	Product-	p-0-0-0-	-0-0-0-0- ending cr	10-0-0-0-0	Density	C - O=
Coast	Depth in		Substra	te %	Rock	Cover %	ive area			Mean	$kg/m^2$	
	meters	Sand	Mud	Coral	ROCK (-)		in sq.m.	limit	limit	1		
1	2	3	4	5 .	6	7	8	9	10	11	12	
Mainland	Intertidal		1 400 400		100.00	25.00	1400	289	289	289	0.205	
	0.0	83 <b>.3</b> 5			16.65	20.60	1660	2117	49 <b>5</b> 0	3533	0.212	•
•	0.5	81.25		12.50	6.25	10.00	21 250	22448	5 <b>9678</b> °	410 <b>6</b> 3	1.932	
	1.0	80.00	13.33		6.66	1.66	16600	2377	3433	2905	0.175	
l Ario Politico de Caración d	1.5	71.66	6.66	6.66	15.00	10.00	1218750	5787	11211	8499	0.007	;
teste de la companya	2.0	80.,35	7.14	3.57	8.92	9,00	3 26 0 50	19172	58756	38964	ി.119	
	4.0	88,46	11.54	1 1 1 1		1.92	75300	3992	3992	3992	0.053	
Total	77,37	77.17	4.34	6.52	11.96	9,00	1675950	56182	142309	99245	0.060	
Upputhani Island	0.0	100.00										
	0.5	75.00			25.00	8.33	15562	986	986	986	0.063	
	1.0	83.33	- ·		16.66	16.66	70342	15367	16634	16000	0.227	
	1.5	41.66	-	33,33	25.00	<b>16</b> 66	70342	12892	12892	12892	0.183	
	2.0	66,66	33.33		· <b></b>	Tr.	44197	74	74	74	0.0017	
	4.0		100.00							00050		
Total		61.11	22.22	5.55	11.11	7.8	200443	29319	30586	29952	0.149	Mar. # 140-
Salli Island	0.0	100.01				Tr.	8437	14	14	14	0.0017	
1	0.5	25.00	1 <b></b>		75.00	33.33	26662	14363	17082	15722	0.590	
	1, 0 3 ° '	-	13 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		\100.00	58.33	20587	10733	11981	11357	0.548	
328 A	1.5				100.00	62.50	5737	1079	2128	1603	∂ ∳ 0 <b>.</b> 280	
	2.0	33.33	4 == ""		66.66	37.50	15525	2730	9250	5990	ാ.386	
	4.0	33.33			66.66				( Sá Ja)	04600		
Total		38.33			61.66	31.7	76948	28919	40455	34687	0.450	

Continued.....

1	2.	,3,	4	5	6	7	. 8	ე √9	10	.11	-
Nallathanni Island	0.0	100.00				16.66	22612	1507	1507	1507	1
	0.5	100.00	11.77			33.33	35175	12415	28033	20224	
	1.0	66.66			33.33	8.33	575362	61367	61367	61367	
	1.5	50.00			50.00						
	2.0	100.00				8.33	3979800	113424	204959	159191	İ
	4.0							110121	2049.59		
Total	13	83.33	,	iá-	16.66	14.3	4612949	188713	295866	242289	-
Yanaiparai Island	Intertid	al 41.06		1	- 58.33	41.66	1800	1209	1247	1228	†
	0.0	66,66			33.33	33.33	43365	13935	16563	15249	
	0.5	33.33		33.33	33.33	25.00	72030	16805	16805	16805	
g financia kan ja maga financia.	1.0	25.00			75.00	25.00	49245	14521	20053	17287	
	1.5	100.00				-					
	2.0	100.00	<b>-</b> -			Tr.	38587	643.	643	643	
	4.0		100.00							440	
Total		52.38	14.30	4.47	28.75	28.3	204027	47113	55311	51212	†-
Palliyamunai Island	0.0	100.00	4		- <del></del>					-	
	0.5	83.33	8.33		8.33	16.66	7790	1771	1771	1771	
	1.0	25.00	66.66		8.33	8.33	27775	8055	8155	8055	
	1.5	66.66	33.33			6.25	159500	25573	34505	30039	
- Particular and a second a second and a second a second and a second	2.0	<b>1</b> 6.66	66.66		16.66	8.33	247500	11549	11549	11549	
Total		6 <b>5.</b> 22	29.05		5.54	6.66	44 24 75	46948	55880	51414	
Nandamukhi Island Ir		100.00		1		12.50	9225	1940	2840	2390	
	0.0			66.66	33.33	25.00	825	135	167	151	
	0.5				107.00	33.00 41.66	1350	470	724 382	5 <b>9</b> :7 3 25	
	1.0		1	66.66			750	268	1	. 1	
and the state of t	1.5			50.00	50.00	16.66	450	96	96	95	
	2.0 4.0	- <b>-</b> ,66.66		66.66 33.33	33.33	8.33	1500	64	64	64	,
Total	<b>*</b> • U	23.81		40.47	35.71	20,00	14100	2973	4273	3623	

## Marine Algal Survey in the III Sector 1973-74 Relative abundance of Substrate, Cover, Standing Crop & Density

Coast	Depth in		Substrat	um %		Cover	Productive		Standing	crop	Kg/m <sup>2</sup>
	meters	Sand	Mud	Coral	Rock	%	Area in	Lower	4 4 1	Mean	
1 1	2	3	4	5	6	7	Sq.m. 8	limit 9	limit 10	11	12
Mainland	Intertidal	80.00	. <b></b>		20.00	20.00	9775	488	∷1096	792	0.081
	0.0	57.50	2.50	5.00	35.00	22.50	40900	9483	14403	11943	0.292
	0.5	62.50	20.00	10.00	7.50	7.50	51100	3526	6298	4912	0.096
e e e e e e e e e e e e e e e e e e e	1.0	53.60	35.70	10.70		18.00	40050	2088	3532	2810	0.070
_	1.5	53.60	39.30	7.10		23.20	<b>7</b> 8400	49699	104283	76991	0.982
	2.0	42.30	57.70			<b>7.</b> 70	357450	171572	171572	171572	0.479
A	4.0	78.60	21.40			Tr.	48750	2250	3274	2762	<u>0</u> .056
Total	(m,0)	58 <b>.0</b> 0	25,60	16,00	10.40	14.80	626425	239106	304458	271782	0.433
Karaya Island	0.0	83,33		16.66	<b>:</b>					·	
	0.5	66.66		33.33			<b></b>	<b>-</b> -			<u></u>
The second secon	1.0	50 <b>.00</b>		50.00		33.33	51637	500.9	953 <b>2</b>	7270	0.140
	1.5	50.00		50.00		25.00	75735	6957	9956	8457	0.111
	2.0	58,33		33.33	8.33	35.00	2518 <b>7</b> 6	42581	155119	98850	0.392
•	4.0	50.00	* 10 July 10		50.00	<b></b>		·			
	- 1 mg		46 4	1 2 3 m	1 11 11 11						
Tota		61.00	-	34.30	4.60	17.50	379248	54547	174607	114577	0.302

Cont'd.....

1	3	-
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THE STATE OF THE PARTY OF THE STATE OF THE S		7	T				T			·	131
1	2	3	4	5	6	· Tank	3.485.8	9	10	11	12
Chally Island	0.0	100.00									
	0.5	100.00				8,33	31970	3942	3942	3942	0.123
	1.0	100.00				20.00	59770	8690	16315	12503	0.209
4	1.5	66.66	emin para	- <u>1</u> - 5919 <sub>1</sub>	33.33	3.33	66720	999	999	999	0.015
	2.0	65.66			33.33	41.66	61160	13102	27315	20 20 8	0.330
	4.0	<b>-</b>	100.00		===		alired delign				
Total		76:60	11.70	E.C.	11.70	13,00	219620	26733	48571	37652	0.171
an Island	0.0	66.66		33.33							
	0.5	100.01								- pd.	i California
	1.0	100.00	*,			8.33	71272	237	237	237	1.003
	1.5	100.00	:			25.00	64285	11626	15469	13548	0.210
	2.0	66,66	33.33			45.00	338195	119603	250146	184874	1.546
	34.0 ·		100.00								
Total		81.20	12.50	6.30		14.70	473752	131466	265852:	198659	0.419
i e i	er er er er er er er er er er er er er e	16.2						:			

Table - 42

Marine Algal Survey in the IV Sector 1974-75

Relative abundance of Substrate, cover, standing crop & density

		Subst	ratum %		Cover	Productive		Standing Cr		Kg/m <sup>2</sup>	
Depth in meters	Sand	Mud	Coral	Rock			Lower limit	Upper limit	Mean	and the state of t	
0.0	83.00			17.00	15.66	26450	22495	70400	46448	1.756	
0.5	79.00			21.00	14.86	66412	79247	335209	207228	3.120	
1.0	67.10			32.90	21.20	248275	141172	701835	421503	1.697	
1.5	61.30			38.70	21.00	979137	184085	634414	409249	0.480	
2.0	48.00			52.00	33.80	2413979	645287	2281800	1463543	0.506	
4.0	35.50	;		64.50	33.69	<b>19345</b> 50	504130	1276125	890128	0.460	
Total	64.80			35.20	22.43	5668803	1576416	5299783	3438099	0.606	

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## Marine Algal Survey in the V Sector 1975-76 Relative abundance of substrate, Cover, Standing Crop & Density

Depth	Sand	Sı Mud	bstrate %		Cover %			Standing crop		kg/m <sup>2</sup>
in meters	in meters Sand Mud Coral Rock	Rock		area in sq. m.	Lower limit	Upper limit	Mean	11-9/		
0.0	37.5		Long St. b	62.5	28,12	39950	9758	10695	7227	0,180
0.5	75.0			25.0	18.75	3400	13629	14505	14067	4.137
1.0	68.75		* come unique	31.25	31.25	7400	6521	7294	6907	0.933
1.5	66.66	••• •••	A 700. B 700.	33.33	16.66	3560า	103161	112219	107690	3. 25
2.0	77.80	<b></b>		22.20	2.80	6 2850	10056	10056	10256	0.160
4.0	<b>77.</b> 80			22.20	7.22	13001	1508	4082	2795	0.215
Total	67.65			32.35	16.96	162200	138633	158851	148742	0.917

# Marine Algal Survey in the I Sector 1971-72 List of marine algae together with their occurrence in the Gulf of Mannar Mainland, Gulf of Mannar Island & Palk Bay

Sr. Species	Gulf of	Gulf of	Palk
10.	Mannar Mainland	Mannar  Islands	Bay
	3	4	5
2			
THE OPODIANT A			
CHLOROPHYTA			
<u>Jlvaceae</u>	_		- 1
1. Enteromorpha clathrata		+	=
2. Enteromorpha flexuosa		4	
3. Enteromorpha prolifera			
4. Enteromorpha sp.			
5. <u>Ul</u> va lactuca	=	The second secon	
6. <u>Ulva reticulata</u>	+	+	<b>*</b>
Cladophoraceae.			
7. Chaetomorpha antennina	+		
8. Chaetomorpha littorea			+-
9. Chaetomorpha torta	+	in the second	
0. Cladophora fascicularis	+	+	
1. Cladophora sp.		+	
12. Rhizoclopium kerneri	+	+	
Protosiphonaceae			-
13. Bryopsis indica			
Caulerpaceae	<u> </u>	+	-
14. Caulerpa crassifolia		+	+
15. Caulerpa cupressoides		+	
16. Caulerpa cupressoides var. lycopodium f. elegance			
17. Caulerpa fastigiata		+	
18. Caulerpa fergusonii	_	<u> </u>	
19. Caulerpa freycinetii	-	+	+
20. Caulerpa lentellifera		+	- 1
The second secon	+	-	+
			+,
22. Caulerpa racemosa	Fera +		+
23. Caulerpa racemosa var.cleavit	rense -	+	-
24. Caulerpa racemosa var. latever	ral +		
25. Caulerpa racemosa var. uvife	itoja -	_	+ 3.5
26. Caulerpa racemosa var. Chemn f. turbinata	ICZIG		
27. Caulerpa chemnitzia			
28. Caulerpa sertularioides	+		1
29. Caulerpa taxifolia	+	+	
30. Caulerpa verticillata	+	<b>-</b>	-
		₹ '	1

2	3	4	5 
Dasycladaceae			
31. Neomeris annulata	_		+
The second secon		The same of the sa	
Codiaceae 32. Avrainvillea erecta	-	+	
	-	+	
33. Avrainyillea sp.		+	
34. Codium coronatum	eg e commentation of the first	+	
35. Codium dwarkense		+	
36. Codium iyengarii		+	+
37. Codium sp.	4	+	
38. Halimeda gracilis		-	+
39. Halimeda macroloba	T		-
4). Udotea flabellum	+		
41. Udotea indica	+		+
42. Udotea iyengarii			+
43. Udotea javensis		an and a second	T
Valoniaceae			n 1
44. Anadyomene stellata			_
45. Dictyosphaeria favulosa	-	+	
46. Microdictyon tenuis	<b>-</b>	+	+
	+	-	-
47. Boergesenia forbesii  48. Valoniopsis pachynema		<b>4</b>	-
The state of the s	-	+	-
49. Valoniopsis sp.			
PHAEOPHYTA			1 * * *
Ectocarpaceae		<b>±</b>	
50. Bachelotia antillarum	+	+	-
51. Ectocarpus sp.			
Dictyotaceae		+	-
52. Dictyota bartayresiana		+	+
53. Dictyota dichotoma			
54. Dictyota sp.		4	
55. Padina gymnospora			+
56. Padina pavonica			
57. Pocockiella variegata			
58. Spatoglossum asperum			
59. Stoechospermum marginatum			
60. Zonaria crenata		*	+
Punctariaceae			
61. Colpomenia sinuosa		+	
	+ *	+	-
Chnoosporaceae fastigiata	_	+	
63. Chnoospora fastigiata			
Cystoseireceae	_	+	-
64. Cystoseira trinodis 65. Hormophysa triquetra		+	+ =

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1 2	3	4	5
Sargaegaga			
Sargassaceae			
66. Sargassum ilicifolium			
67. Sargassum linifolium		+	*
68. Sarqassum plagiophyllum	+	+	
69. Sargassum tenerrimum	+	+	_
70. <u>Sargassum wightii</u>	-	+	- 3
71. Sargassum sp.			
72. Turbinaria conoides	+	+	+
73. Turbinaria conoides var. conoides f. laticuspidata	+ · · · · · · · · · · · · · · · · · · ·		±
74. Turbinaria conoides f. evesciulosa	-	_	+
75. Turbinaria ornata f. erecta		-	Table 1
76. Turbinaria ornata f. ecortica	+	+	
RHODOPHYTA .			
<u>Chantransiaceae</u>			
77. Acrochaetium sp.	+	<b>-</b> , , , ,	
Chaetangiaceae			
78. Galaxaura oblongata	<u> </u>	+	
Gelidiaceae			
79. Gelidium heteroplatos		+	
80. Gelidium micropterum	+		al paragraphic services
81. Gelidium pusillum	+	_	-
Gelidiellaceae			
82. Gelidiella acerosa	+	+	
Rhizophyllidaceae	* * * * * * * * * * * * * * * * * * *		
83. Chondro occus hornemanii	+		
Squamariaceae			T
	je Jenovije se		
84. Peyssonelia obscura	_		+
Corallinaceae			
85. Amphiroa anceps	-	_	+
86. Amphiroa fragilissima		and the same of th	+
87. Amphiroa foliaces	-		
88. Cheilosporium spectabile	+		
89. <u>Jania iyengarii</u>	+	+	+
90. <u>Jania capillacea</u>		+	
91. Lithothamnion prolifera	And the second s		West State
92. Lithothamnion sp.		+	
93. Lithophyllum sp.	-		
94. Melobesia farimosa	+	+	
Grateloupiaceae			
95. Halymenia floresia		and the second second	the first of the same
			e de la companya de l

1 2	3	4	5
Gracilariaceae		* ! !	} \$
96. Gelidiopsis repens			<u>.</u>
97. Gelidiopsis variabilis	T		
98. Gracilaria corticata		T	
		••••••••••••••••••••••••••••••••••••••	-
99. Gracilaria crassa			
100. Gracilaria disticha	-	4	
101. Gracilaria dura	-	+	-
102. Gracilaria edulis 🛦	<u></u> f	+	+
103. Gracilaria foliifera	+	+	+
104. Gracilaria foliifera f. granatea	-	+	
105. <u>Gracilaria pygma<b>ea</b></u>	-	+	-
106. Gracilaria verrucosa	+ .,		
107. Gracilaria sp.	-	. +	
Solieriaceae			
108. Sarconema filiforme			
Hypneaceae			
109. <u>Hypnea esperi</u>			
110. Hypnea musciformis			
111. Hypnea pannosa		+	
112. Hypnea servicornis		****	
113. Hypnea valentiae	+	+	
114. Hypnea sp.			
		+	
Phyllophoraceae			
115. Phyllophora sp.	+ -		
	ز کے سرت سے نوم		
Rhodymeniaceae	(1) 10 10 10 10 10 10 10 10 10 10 10 10 10		
116. Rhodymenia australis	<u>.</u>		
117. Rhodymenia dissecta			
118. Rhodymenia sp.		4	
Lomentariaceae			
119. Champia parvula			
Ceramiaceae			0
120. Hormothamnion entromorphoides	- !	+	
121. Centroceras clavulatum	+	+	
122. Ceramium gracillimum		+	
123. Ceramium subdichotomum		+ 1	
124. Ceramium sp.		+++	
125. Spyridia filamentosa	-		
Delesseriaceæ			
126. Vanvoorsitia spectabilis			
<del>-</del> ,		*** * ** ***	

			13/
1 2	3	4	5
	ļ	<b></b>	
Rhodomelaceae			
127. Acanthophora delilei	+	_	#
128. Acenthophora muscoides	+	1	-
129. Acanthophora spicifera		+	
130. Acanthophora thierii		+	
131. Acenthophore sp.	_	+	ene
132. Bostrychia tenella	The second secon		+
133. Chondria armata		<u>.</u>	4
134. Chondria armata var. Plumaris	na Parina (1911 - Arangana Arangana Arangana Arangana Arangana Arangana Arangana Arangana Arangana Arangana Ar Managana Arangana Ar	_	+
135. Chondria dasyphylla	-	+	<b>-</b>
136. Chondria tenuissima	+	-	-
137. Herposiphonia insidiosa	+	+	-
138. Herposiphonia tenella	+ +	-	_
139. Eaurencia ceylanica		+	emb
140. Laurencia cruciata	+ 1	+	***
141. Laurencia bostrychiodes	-	+	_
142. Laurencia paniculata	+		
143. Laurencia perforata	+	+	+
144. Laurencia papillosa	-	+	+
145. Laurencia sp.	-	+ -	
146. Leveillea jungermannioides	-	- <del>-</del> -	-
147. Fostiella minutata	+ †	+	
148. Tolypeocladia glomerulata	_	<b>-</b>	
149. Neurymenia fraxinifolia		+	+
150. Polysiphonia sp.	+		
CYANOPHYTA			
Oscillatoriacoa			. ,
151. Lyngbya majuscula	_	+	_
152. Lyngbye sp		+	+
153. Phormidium cenuis		+	-
154. Microcoleus chthnoplastes		+	
155. Oscillatoria sp.		+	
100. Obcitional op.			
*		<del></del> -	
/PK/			
	-		