*Available online at* www.ijpab.com

ISSN: 2320 – 7051
*Int. J. Pure App. Biosci.* **2 (3):** 135-138 (2014)

*Research Article*

INTERNATIONAL JOURNAL OF PURE & APPLIED BIOSCIENCE

# Distribution and Seasonal Variation of Some *Caulerpa* species (Green Seaweed) in Thoothukudi Region, The South East Coast of Tamil Nadu, India

**John Peter Paul J.* and Mahadevi, B.**
Research Department of Botany, St. Xavier's College (Autonomous), Palayamkottai – 627 002, Tamil Nadu, India
*Corresponding Author E-mail: johnarock2008@yahoo.com

## ABSTRACT

*The present study was carried out for the distribution of some Caulerpa species in Thoothukudi region in the south east coast of Tamil Nadu, India. Caulerpa species were collected seasonally from intertidal and subtidal regions. Caulerpa species were enumerated at random using a quadrate (0.5m$^2$). A total of five species of Caulerpa were collected in the study area such as Caulerpa mexicana, Caulerpa racemosa, Caulerpa scalpelliformis, Caulerpa sertularioides and Caulerpa taxifolia. The frequency and density were calculated and all the Caulerpa species showed a similar pattern of seasonal variation. Among the seaweeds collected the highest frequency (68.75%) and density (4.70) were observed in Caulerpa scalpelliformis during summer season and the lowest frequency (21.25%) and density (1.17) were recorded in Caulerpa taxifolia during post-monsoon season. In the present study all the Caulerpa species (Chlorophyceae) exhibited the maximum frequency and density during the summer season followed by the declined trend was observed in the pre-monsoon and monsoon seasons. During the post-monsoon season the frequency and density of Caulerpa species (Chlorophyceae) was minimum in the selected region of the south east coast of Tamil Nadu, India.*

***Keywords:*** *Frequency, Density, Seasons, Caulerpa.*

## INTRODUCTION

The south east coast of Tamil Nadu in India is a unique marine habitat infested with diverse seaweeds. Seaweeds are the extraordinary sustainable resources in the marine ecosystem which have been used as a source of food, feed, medicine and industrial products. It was estimated that about 90% of the species of marine plants are seaweeds and about 50% of the global photosynthesis is also contributed by seaweeds[1]. Approximately 841 species of seaweeds found in intertidal, subtidal and deep water regions of the Indian coast[2]. The distribution of seaweeds is determined by many factors such as physical and chemical characters of marine water and other organisms. The ecology of seaweeds is dominated by three specific environmental requirements. As a result, the seaweeds show distinct pattern of seasonal variability throughout the year. Each and every species of seaweed also showed the seasonal variation with respect to the station and the seasons[3].

There are only some studies on the distribution, frequency and density of seaweeds. Quantitative studies are of great value in ecological investigations and the numerical estimation of the seaweeds in a particular habitat is helpful for the collection of the particular seaweed for their economic and ecological value. Seaweeds are commonly categorized in to three groups such as Chlorophyceae (Green seaweeds), Phaeophyceae (Brown seaweeds) and Rhodophyceae (Red seaweeds) especially on the basis of the pigments and the stored food materials[4]. Among the Chlorophyceae (green seaweeds) members are abundantly present in Indian marine water. The seaweed genus *Caulerpa* has garnered much attention in recent years as they have the potential to supplant native vegetation, thereby altering the structure and function of the subtidal marine landscape[5]. This *Caulerpa* genus has a record of stress on marine habitats with a great impact on different species and communities of algae, seagrasses, marine invertebrates and

fishes[6]. In the present study, the continuous field survey was conducted to investigate the distribution of *Caulerpa* species at different stations of Thoothukudi region along the south east coast of Tamil Nadu, India to provide a potential explanation for seasonal variability pattern observed for the *Caulerpa* species according to marine environmental conditions related to its distribution.

## MATERIALS AND METHODS

The Thoothukudi region in the south east coast of Tamil Nadu, India extends from Manapad in the south to Vembar in the north. The entire study area was categorized in to four stations namely Manapad ($S_1$), Trichendur ($S_2$), Thoothukudi ($S_3$) and Vembar ($S_4$). The survey of seaweeds from the intertidal area was carried out during low tide. For the sampling of seaweeds transect lines and a quadrat ($0.5m^2$) was used. Samples were selected at random as per requirement. This was carried out by selecting sampling points in the area using quadrat. Sampling points were selected in such a manner that every species of the study area has good chance of being selected. The number of quadrats was determined as per the area selected. For this purpose the whole station (For example station $S_1$) was divided into four segments namely segment A, segment B, segment C and segment D. Quadrats were placed every three meters on four segments. Each segment was 250m long in which 80 quadrats were placed. Monthly 160 quadrats were taken and the number varying according to the tidal height. Seaweed species present in the quadrats were observed, counted species wise and number of individuals in each species was noted for quantitative assessment such as frequency and density[7].

## RESULTS AND DISCUSSION

Totally there are five species of *Caulerpa* namely *Caulerpa mexicana*, *Caulerpa racemosa*, *Caulerpa scalpelliformis*, *Caulerpa sertularioides* and *Caulerpa taxifolia* collected from Thoothukudi region (Fig.1) and all the species found in the study area were observed throughout the year. Though all the members of *Caulerpa* showed similar patterns of seasonal distribution, with respect to frequency and density high level of variability was observed between the seasons and stations. Among the four seasons studied, all the taxa of *Caulerpa* observed during summer with high frequency and density in the study area.

A well marked declining in the frequency and density were recorded in the subsequent seasons of pre-monsoon and monsoon. The post-monsoon season was noted to be poor growth of *Caulerpa* members which showed the lowest frequency and density in the present study.

**Fig-1. *Caulerpa* species of different stations of Thoothukudi region**

**A. *Caulerpa mexicana* Sonder ex Kuetzing** **B. *Caulerpa racemosa* (Forssk.) Web. V. Bosse**

**C. *Caulerpa scalpelliformis* (R. Br.) Web. V. Bosse D. *Caulerpa sertularioides* (Gmelin) Howe**

**E. *Caulerpa taxifolia* (Vahl.) C. Ag.**

Among those species which were observed in all the four stations, the species *Caulerpa scalpelliformis* showed the highest frequency (68.75%) and the species *Caulerpa sertularioides* showed the lowest frequency (41.00%) during summer in Kanyakumari region, while during the post-monsoon season *Caulerpa scalpelliformis* was observed to be the highest frequency (48.75%) and *Caulerpa taxifolia* was with the lowest frequency (21.25%) as shown in Table 1.

**Table 1: Seasonal variability of Chlorophyceae in Thoothukudi region of the southern coast of Tamil Nadu, India**

| | | Post-monsoon | | Summer | | Pre-monsoon | | Monsoon | |
|---|---|---|---|---|---|---|---|---|---|
| S.No. | Name of the Seaweeds | F | D | F | D | F | D | F | D |
| 1 | *Caulerpa mexicana* | 35.00 | 1.35 | 47.50 | 3.00 | 43.75 | 2.76 | 41.25 | 2.08 |
| 2 | *Caulerpa racemosa* | 30.00 | 1.58 | 53.75 | 2.48 | 50.00 | 1.92 | 36.25 | 1.66 |
| 3 | *Caulerpa scalpelliformis* | 48.75 | 2.65 | 68.75 | 4.70 | 56.25 | 3.85 | 51.25 | 2.81 |
| 4 | *Caulerpa sertularioides* | 28.75 | 1.30 | 41.00 | 1.80 | 37.50 | 1.47 | 33.75 | 1.46 |
| 5 | *Caulerpa taxifolia* | 21.25 | 1.17 | 45.00 | 1.53 | 43.75 | 1.38 | 41.25 | 1.22 |

F- Frequency D- Density

Though the members of *Caulerpa* showed the similar pattern of seasonal distribution, high level of the variability was observed with respect to density between the seasons and stations. In *Caulerpa* species, *Caulerpa scalpelliformis* showed the highest density (4.40) during summer and the lowest density (2.65) during post-monsoon season. *Caulerpa taxifolia* showed the lowest density (1.17) at post-monsoon and the highest density (1.53) at summer season. From the present observations, it was noted that both frequency and density of all the *Caulerpa* taxa varied with seasons and stations. All the taxa of *Caulerpa* exhibited an uniform pattern of increase in frequency and density during summer followed by decrease in frequency and density in the successive seasons and the rate of increase or decrease varied with taxa and stations.

The similar pattern of distribution was also recorded in *Caulerpa* species from Kanyakumari[8] Tirunelveli region[9], *Enteromorpha* species from Kanyakumari region[10], *Ulva* species[11] and *Chaetomorpha* species[12] from Tirunelveli region. In the earlier reports, seasonal variability of green seaweeds (Chlorophyceae) were recorded and all the green seaweeds showed the similar pattern of seasonal distribution that all the chlorophyceae members were observed to have the highest frequency and density during summer season followed by decline trend were observed in the successive seasons (pre-monsoon and monsoon). The similar results were also reported in the present study. In contrast, it was noted that both frequency and density of all the *Laurencia* (Red seaweed) taxa varied with seasons and stations. All the taxa of *Laurencia* exhibited an uniform pattern of increase in frequency and density during monsoon season followed by decrease in frequency and density in the successive post-monsoon season, during the summer season all the *Laurencia* species were disappeared and the *Laurencia* species reappeared during pre-monsoon season. The rate of increase or decrease in frequency and density varied with taxa and stations[13]. In the concordance of present study with previous studies, it was noted that all the *Caulerpa* species (green seaweeds) were observed during summer with the highest frequency and density and during post-monsoon season with the lowest frequency and density.

## CONCLUSIONS

In the present study, it was concluded that both frequency and density of all the *Caulerpa* species varied with seasons and stations. All the taxa of *Caulerpa* exhibited an uniform pattern of increase in frequency and density during summer followed by decrease in frequency and density in the successive seasons such as pre-monsoon and monsoon seasons. During the post-monsoon season, all the *Caulerpa* species were observed with the lowest frequency and density. And the rate of increase or decrease of frequency and density varied with taxa and stations.

## REFERENCES

1. Dhargalkar VK and Neelam P. Seaweed: promising plant of the millennium. *Science and Culture*, **71**: 60-66 (2005)
2. Oza RM and Zaidi SH. A Revised Checklist of Indian Marine Algae, Central Salt and Marine Chemicals Research Institute, Bhavanagar, India, Pp. 296 (2000)
3. John Peter Paul J. Seasonal variability of *Laurencia* species (Red seaweed) in Tirunelveli region, the south east coast of Tamil Nadu, India. *Research Journal of Marine Sciences*, **1(1)**: 6-9 (2013)
4. Jagadeesan L, Kannadasan A, Anantharaman P, Perumal P and Thangaraj M. Assessment of Ammonium Uptake by Marine Macroalga *Gracilaria verrucosa* (Rhodophyta), *Current Research Journal of Biological Sciences*, **2(2)**: 150-153 (2010)
5. John Peter Paul J and Patric Raja D. Seasonal Variation of some *Caulerpa* species in Kanyakumari region, the southern coast of Tamil Nadu, *Life Sciences Leaflets*, **1**: 27-30 (2013)
6. Mazumder S. Industrial polysaccharides from natural sources: structure and function. Ph.D. Thesis, The University of Burdwan, Burdwan, India. Pp. 1-69 (2006)
7. John Peter Paul J. Studies on Seaweed resources and ecology of southern coastal region of Tamil Nadu. Ph.D., thesis submitted to Manonmaniam Sundaranar University, Tirunelveli. Pp.35-36, (2012)
8. John Peter Paul J and Patric Raja D. Seasonal variation of some *Caulerpa* species in Kanyakumari region, the southern coast of Tamil Nadu. *Life Sciences Leaflets*, **1**: 27-30 (2013)
9. John Peter Paul J and Patric Raja D. Seasonal variation of some *Caulerpa* species (Chlorophyceae) in Tirunelveli region, the Southern coast of Tamil Nadu. *Journal of Chemical, Biological and Physical Sciences*, **2(4)**: 2433-2439 (2013)
10. John Peter Paul J and Patric Raja D. Seasonal variability of some *Enteromorpha* species in Kanyakumari region, the southern coastal region of Tamil Nadu. *Asian Journal of Biological and Life Sciences*, **1(3)**: 147-149 (2012)
11. John Peter Paul J and Shri Devi SDK. Seasonal variability of *Ulva* species (Green seaweed) in Tirunelveli region, the south east coast of Tamil Nadu, India. *Research Journal of Marine Sciences*, **1(1)**: 14-17 (2013)
12. John Peter Paul J. Seasonal variability of *Chaetomorpha* species (Green seaweed) in Tirunelveli region, the south east coast of Tamil Nadu, India. *International Journal of Pharmacy and Integrated Life Sciences*, **1(10)**: 33-41 (2013)
13. John Peter Paul J. Seasonal variability of *Laurencia* species (Red seaweed) in Tirunelveli region, the south east coast of Tamil Nadu, India. *Research Journal of Marine Sciences*, **1(1)**: 6-9 (2013)