



# Diversity and distribution of seaweeds in the Manapad Regions, Southern coast of Tamilnadu, India

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## Abstract

The seaweeds composition and distribution in the Manapad region is reported in this paper. A total of 73 seaweeds were observed and recorded in the Manapad region: of which, 27 species are belongs to Chlorophyta, 20 species of Phaeophyta and 26 species of Rhodophyta. The results of the present study confirmed the seasonal influence on seaweeds occurrence in the Manapad region during pre-monsoon, monsoon and post-monsoon. *Enteromorpha compressa*, *Ulva fasciata*, *Caulerpa scalpelliformis* *Chaetomorpha antennia*, *Chaetomorpha balls*, *Sargassum wightii*, *Padina tetrastromatica*, *Stoechospermum marginatum*, *Gracilaria fergusonii*, *Hypnea musciformis* and *Laurencia papillosa* were the commonly occurring seaweeds in the rocky shores and other submerged hard surfaces.

**KEY WORDS:** Seaweeds; Marine Macro algae; South Indian Ocean.

## Introduction

Since time immemorial, the seaweeds are act as an important renewable resource and play a vital role in the day today needs. Globally, about 9200 species of seaweeds are estimated, of which 6000 species are belongs to red seaweeds (Rhodophyceae), 2000 species of brown seaweeds (Phaeophyceae) and 1200 species of green seaweeds (Chlorophyceae) (Kaliaperumal, 2007). The Indian seaweed flora is highly diversified and includes 271 genera and 1153 species of marine algae (Anon, 2005; Mohanraju and Pujari Tanushree 2012). Earlier studies reported that the southern coastal region of Tamilnadu was rich in algal flora with more than 200 species of seaweeds. Due to the climatic changes and anthropogenic pressure, the wealth of the seaweeds biodiversity of southern coastal region of Tamilnadu was gradually decreased (Krishnamurthy, 2006; Kannan and Thangaradjou, 2006). The wealth of seaweed resources is totally depends on the physico-chemical properties of the seawater. The changes in the physico-chemical parameter directly affect the distribution of seaweeds. Recently, several workers studied the floristic wealth of the marine algae growing in Mandapam and Kanyakumari regions (Stella et al., 1997; Krishnamurthy, 2006; Kannan and Thangaradjou, 2006; Kaliaperumal, 2007; John Peter Paul and Patric raja,

2011; John Peter Paul, 2012; John Peter Paul and Patric raja, 2013). Previously Subba Rao et al (1993) studied the seaweed resources of alanthali - manapad. After Tsunami, there is no report on the floristic report on Manapad region. With this knowledge the present study was undertaken to know the marine macro algal composition and distribution from July 2009 to June 2012.

## Materials and methods

Species diversity and distribution was carried out once a month every year at Manapad region from July 2009 to June 2012. Benthic marine macroalgae were sampled thoroughly by wading or snorkeling. Complete thalli of live specimens were uprooted by hand or with paint-scraper, placed in plastic bags, labelled by location and date of collection, and transported to laboratory. Algal samples were rinsed to remove sediment and debris, photographed, preserved as herbarium vouchers, or, on some occasions, preserved in 4% formalin-seawater solution, and deposited at the Centre for Plant Biotechnology, St. Xavier's College (Autonomous), Palayamkottai. The species identification was based on gross morphology and internal features. To know the seasonal influence, the study period was divided in to three season viz., Premonsoon, Monsoon and Post monsoon. During

every season the seaweeds were harvested and recorded their occurrence.

## RESULT AND DISCUSSION

The seasons are result of the tilt of Earth's axis that causes variation in environmental conditions and the diversity frequency and abundance of the seaweeds are influenced by these changes. To understand the ecology and its importance in the distribution of seaweeds in natural marine ecosystems, it is necessary to clarify seasonal diversity of seaweeds, providing insight into the seasonal regulation on seaweed diversity distribution. The results of the present study confirmed the seasonal influence on seaweeds occurrence in the Manapad region (Pre-monsoon, Monsoon and Post-monsoon). The results of the present study clearly explained the seasonal influence on the species diversity and distribution. The number of species occurrence were varied with reference to the season and ranged from 7-19 (July 2009 to June 2011).

The results of the present study revealed the presence of 73 species from the Manapad region. Of which, 27 species are belongs to Chlorophyta, 20 species of Phaeophyta and 26 species of Rhodophyta (Table 1 - 3). Totally twenty seven species of green seaweeds were collected in the study period. Among these, fourteen species were collected in pre-monsoon, twenty six species were in monsoon and nineteen species in post-monsoon. *Ulva lactuca*, *Caulerpa scalpelliformis*, *Caulerpa sertularioides*, *Caulerpa corynephora*, *Codium bursa*, *Halimeda macroloba*, *Halimeda tuna*, *Chaetomorpha balls*, *Chaetomorpha linum* and *Chaetomorpha antenna* were showed their presence throughout the sampling period.

Twenty brown seaweeds were observed in study area during the three year study period. Of which, eight species were found in pre-monsoon, seventeen species were found in monsoon and nine species were found in post-monsoon. The seaweeds *Padina tetrastromatica*, *Sargassum swartzii* and *Sargassum wightii* were showed their occurrence in all the three studied seasons. Twenty six species of red seaweeds were collected from the present study area. Among this thirteen species were showed their occurrence in the pre-monsoon, twenty five species were showed their presence in the monsoon and fifteen species were illustrated their existence in the post-monsoon of the study period. The seaweeds *Gracilaria fergusonii*,

*Laurencia obtusa* and *Laurencia papillosa* were showed their occurrence throughout the study period. Studies on the diversity and distribution of seaweeds in Indian waters were carried out by several authors (Untawale et al., 1989; Kalimuthu et al., 1995; Jayachandran & Ramaswamy 1997; Kaliaperumal & Kalimuthu, 1997; Stella Roslin et al., 1997; Selvaraj & Selvaraj, 1997; Mohammed et al., 1999; James et al., 2004; Krekar, 2004; Rath & Adhikary, 2006; Satheesh & Samuel Godwin Wesley., 2012). Southeast coast of India is a unique marine habitat characterized by a high biodiversity. Results of the present study confirmed the presence of 73 seaweeds in the Manapad regions; most of the seaweeds such as *Enteromorpha compressa*, *Ulva fasciata* Delil, *Caulerpa scalpelliformis*, *Chaetomorpha antenna*, *Chaetomorpha balls*, *Sargassum wightii* Greville, *Padina tetrastromatica*, *Stoechospermum marginatum*, *Gracilaria fergusonii*, *Hypnea musciformis* and *Laurencia papillosa* were the commonly occurring seaweeds in the rocky shores and other submerged hard surfaces. The results of the present study revealed the richness of seaweed resources presents in the Manapad region. The present study could be helpful for future biosystematic and bio-efficacy studies on the seaweeds of Manapad regions. Further systematic studies on the seaweed resources may provide useful data for the conservation of marine algal resources in this region.

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**Table 1: The List of Green Seaweeds from Manapad Regions**

Chlorophyta	Seasons		
	Pre-monsoon	Monsoon	Post-monsoon
<i>Enteromorpha compressa</i> (L.) Greville	+	+	+
<i>Enteromorpha intestinalis</i> (L.) Nees	-	+	-
<i>Ulva fasciata</i> Deile	+	+	+
<i>Ulva lactuca</i> L.	+	+	+
<i>Ulva reticulata</i> Forssk	-	+	-
<i>Ulva rigida</i> C. Agardh	-	+	+
<i>Caulerpa corynephora</i> Mont.	+	+	+
<i>Caulerpa cupressoides</i> (Vahl) C. Agardh	-	+	-
<i>Caulerpa peltata</i> J. V. Lamourex	+	+	-
<i>Caulerpa racemosa</i> (Forssk.) J. Agardh	-	+	-
<i>Caulerpa taxifolia</i> (M. Vahl) C. Agardh	-	+	+
<i>Caulerpa scalpelliformis</i> (R. Brown ex Turner) C. Agardh	+	+	+
<i>Caulerpa sertularioides</i> (S.G. Gmelin) M.A. Howe	+	+	+
<i>Caulerpa catoides</i>	-	+	+
<i>Caulerpa laetevirens</i> Montagne	-	+	+
<i>Caulerpa crassifolia</i> C. Agardh	-	+	+
<i>Codium iyengarii</i> Borgesen	-	+	-
<i>Codium tomentosum</i> Stackhouse,	-	+	+
<i>Codium elongatum</i> (Turner) C. Agardh	+	-	-
<i>Codium bursa</i> (Oliv.) C. Agardh	+	+	+
<i>Halimeda macroloba</i> Desaisne	+	+	+
<i>Halimeda tuna</i> (J. Ellis & Solander) J.V. Lamourex	+	+	+
<i>Udotea indica</i> A. Gepp & E.S. Gepp	-	+	-
<i>Chaetomorpha media</i> (C. Agardh) Kutzing	-	+	+
<i>Chaetomorpha antennia</i> (Bory de Saint-Vincent) Kutzing	+	+	+
<i>Chaetomorpha aerea</i> (Dillwyn) Kutzing	+	+	+
<i>Chaetomorpha linum</i> (O.F. Muller) Kutzing	+	+	+
	14	26	19

**Table 2: The List of Brown Seaweeds from Manapad Regions**

Phaeophyta	Seasons		
	Pre-monsoon	Monsoon	Post-monsoon
<i>Dictyota ciliata</i> J. Agardh	-	+	+
<i>Dictyota dichotoma</i> (Hudson) J.V.Lamouroux	+	+	-
<i>Padina commersonii</i> Bory de Saint-Vincent	+	+	-
<i>Padina pavonica</i> (L.) Thivy	-	+	-
<i>Padina tetrastrumatica</i> Hauck	+	+	+
<i>Padina boergesenii</i> Allender & Kraft	-	+	+
<i>Stoechospermum marginatum</i> (C. Agardh) Kutzing	+	+	+
<i>Zonaria crenata</i> J. Agardh	-	+	+
<i>Chnoospora fasigiata</i> J. Agardh	-	+	-
<i>Sargassum duplicatum</i> J. Agardh	+	+	-
<i>Sargassum polycystum</i> C. Agardh	-	+	-
<i>Sargassum swartzii</i> C. Agardh	+	+	+
<i>Sargassum wightii</i> Greville ex. J. Agardh	+	+	+
<i>Sargassum tenerrimum</i> J. Agardh	-	+	-
<i>Sargassum ilicifolium</i> (Turner) C. Agardh	-	+	-
<i>Turbinaria ornata</i> (Turner) C. Agardh	-	+	+
<i>Turbinaria conoides</i> (J. Agardh) Kutzing	-	+	+
<i>Chnoospora fastigata</i> J. Ag.	+	+	-
<i>Hydroclathrus clathratus</i> (Bory) Howe	-	-	-
<i>Colpomenia sinuosa</i> (Roth) Derbes & Solier	+	+	-
	8	17	9

**Table 3: The List of Red Seaweeds from Manapad Regions**

Rhodophyta	Seasons		
	Pre-monsoon	Monsoon	Post-monsoon
<i>Amphiroa anceps</i> (Lamk.) Decsne.	+	+	+
<i>Amphiroa fragilissima</i> (L.) J.V.Lamouroux	-	+	+
<i>Amphiroa rigida</i> J.V.Lamouroux	-	+	+
<i>Grateloupia filicina</i> (J.V.Lamouroux) C.Agardh	+	+	-
<i>Halymenia porphyroides</i> Børgesen	-	+	+
<i>Gracilaria corticata</i> J. Ag.	-	+	+
<i>Gracilaria edulis</i> (S.G.Gmelin) P.C.Silva	-	+	-
<i>Gracilaria fergusonii</i> J. Ag.	+	+	+
<i>Gracilaria verrucosa</i> (Huds.) Papenfuss	-	+	-
<i>Sarconema filiforme</i> (Sonder) Kylin	+	-	-
<i>Solieria robusta</i> (Grev.) Kylin	-	+	+
<i>Hypnea musciformis</i> (Wulfen) J.V.Lamouroux	+	+	+
<i>Hypnea valentiae</i> (Turn.) Mont.	+	+	-
<i>Botryocladia leptopoda</i> (J. Ag.) Kylin	-	+	+
<i>Rhodymenia australis</i> Sonder	+	+	-
<i>Champia indica</i> Boergs.	-	+	+
<i>Acanthophora spicifera</i> (Vahl) Børgesen	-	+	+
<i>Acanthophora delilei</i> Lamour.	-	+	+
<i>Laurencia flagelliformis</i> J. Agardh	-	+	-
<i>Laurencia obtusa</i> (Hudson) Lamourux	+	+	+
<i>Laurencia papillosa</i> (Forssk.) Grev.	+	+	+
<i>Laurencia poiteaui</i> (Lamouroux) Howe	+	+	-
<i>Laurencia pedicularioides</i> Boergs.	-	+	+
<i>Grateloupia filicina</i> (Wulfen) C. Ag.	+	+	-
<i>Porphyra tenera</i> Kjellm.	+	+	-
<i>Neurymenia fraxinifolia</i> (Mert.) J. Ag.	+	+	-
	13	25	15

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