



Status of Gorgoniidae (Octocorallia) from the Gulf of Mannar Biosphere Reserve, Tamil Nadu, South India

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ABSTRACT

The Gulf of Mannar, located in the south-east coast of India with an area of 10,500 km² (8° 47' - 9° 15' N and 78° 12' - 79° 14' E), is a major fishing zone in the Indian waters. The fisher folk of this area make their livelihood by exploiting finfish's and shellfishes as well as marine algae and other resources of this area. As resulted in the depletion of these population. Extensive survey for gorgonian was conducted during 2008 in the sub- tidal regions of Vembar and Thoothukudi groups of Islands in the Gulf of Mannar Biosphere Reserve using SCUBA. The survey report brings out 14 different species belonging to 5 families from this region, The genera *Dichotella*, *Ellisella*, *Acabaria*, *Melithaea*, *Menella*, *Paracis* and *Annella* are the new addition and observed and reported from the Gulf of Mannar Islands.

Keywords: Gorgonians, New addition, Gulf of Mannar, South India.

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Received 27 May 2014, Accepted 08 June 2014

Please cite this article in press as: Geetha S *et al.*, Status of Gorgoniidae (Octocorallia) from the Gulf of Mannar Biosphere Reserve, Tamil Nadu, South India. American Journal of Pharmacy & Health Research 2014.

INTRODUCTION

The present communication is a diversity and distribution record of gorgonians from Gulf of Mannar coast. In India, gorgonian fishery started in 1975 and bulks of material have been exported to countries like France, Germany, Belgium, USA and Netherlands till 1984. A quantitative analysis of the exports during the 1975-84 period revealed that as much as 80.6 tonnes were exploited from India, particularly 22 species from 7 families and 15 genera were an important export from India¹. The reason behind such large scale export was due to the discovery of Prostaglandins (PGA, PGB, PGE, PGE2, PGF, PGF2-D, PGF and some) from a gorgonian *Plexaura homomalla*². Also, the genus *Subergorgia* has been associated with promising bioactivity such as cytotoxicity, antifeeding activity and some^{3,4,5,6}. Gorgonians are also known to be a rich source of several other compounds like sterols, terpenoids, with proven medical properties. Prostaglandin and Its derivatives are extracted from gorgonians and served as “Wonder Drugs” for many systemic diseases in both humans and animals. Apart from prostaglandins, gorgonians are rich sources of terpenoids. So far about 74 such compounds have been isolated from different species of gorgonians and these may be classified under diterpene, sesquiterpene and artifact. The types and concentration of these compounds vary greatly between various species⁷.

Venkataraman *et al.* (2004)⁸ reported 27 species of gorgonians belonging to 8 families and 19 genera from India. Among them 10 species under 4 families and 9 genera have been reported from Andaman and Nicobar (Venkataraman, *et al.*, 2004)⁸; 13 species belonging to 12 genera were recorded from Ritchie’s Archipelago, South Andaman (Yogesh *et al.* 2012d)⁹. 12 species of gorgonians from 4 families and 9 genera have been reported from the northeast coast of India (Thomas *et al.*, 1995)¹⁰. However in the Gulf of Mannar coast, 13 species from Thoothukudi, 10 species from Keelakari and Rameswaram (Thomas and Rani Mary George, 1987a)¹, 9 species belong to 8 genera, 5 families have been recorded from Gulf of Mannar by Molly Varghese *et al.*, 2007¹¹. In the present study, an attempt has been made to assess the diversity and abundance of gorgonians in the Gulf of Mannar coast.

MATERIALS AND METHODS

In India, Gulf of Mannar is one of the major coral reef areas. It’s covering an area of about 10,500 sq.m and 21 reef islands from Thoothukudi to Rameswaram. These 21 islands divided into four groups that Mandapam groups (7 Islands), Keezhakkarai Groups (7 islands), Vembar groups (Upputhanni Island, Pulivinichalli Island, Nallathanni Island) and Thoothukudi groups

(Van Island, Koswari Island, Kariyachalli Island). The present study explored a distribution of gorgonians at Thoothukudi groups, Vembar groups and one Deeper region(Main land) of Islands from Gulf of Mannar and determined from a series transects laid during the period from 2007 to 2009. The line intercept transect was employed at the study area by SCUBA diving from 2-20 m depth. The number of transects examined within an area was based on the size of the area and the density of gorgonians available in that area (English *et al.*, 1997)¹². The specimens were identified based on the morphological characteristics of the colonies and sclerite structure. Sclerites were extracted using 5% Sodium hypochlorite (Bayer, 1961)¹³.

RESULTS AND DISCUSSION

Present study observed and reported 14 species under 14 genera belonging 5 families of gorgonians from Thoothukudi and Vembar group of Islands, Gulf of Mannar. Among the 14 species observed 7 species were observed from Van Island and Koswari Islands, 8 species from Kariyachalli Island and Nallathanni Island, 10 species from Upputhanni Island and Mainland (Table 1). The underwater photographs taken from the study sites during the study period are presented in plate I and II.

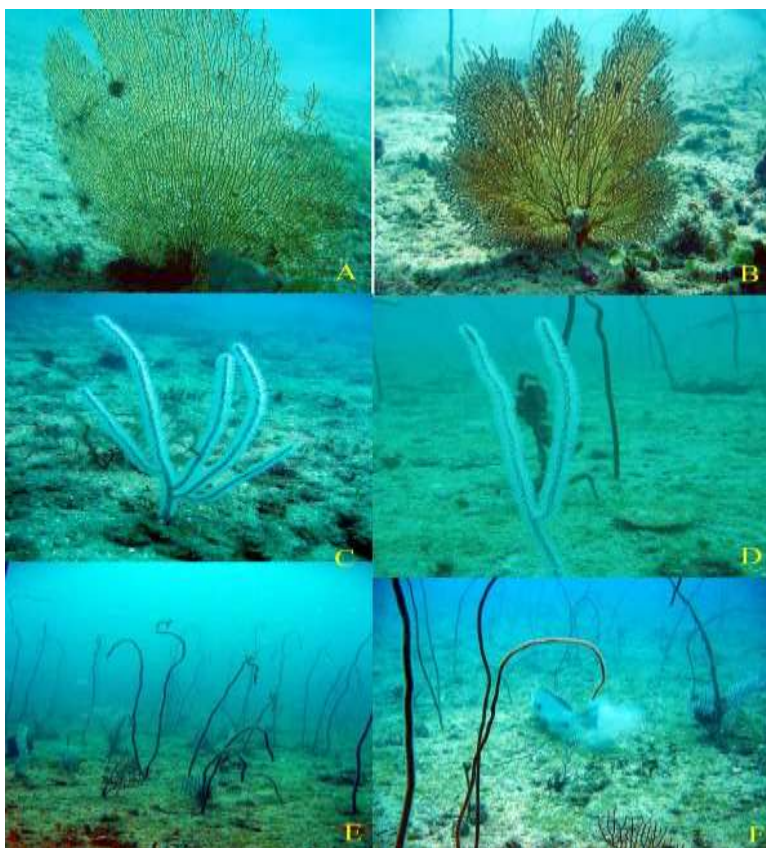


Figure 1 A- *Heterogorgia* sp., B- *Muricella* sp., C- *Dichotella* sp., D- *Ellisella* sp. E, F - *Juncella jencea*

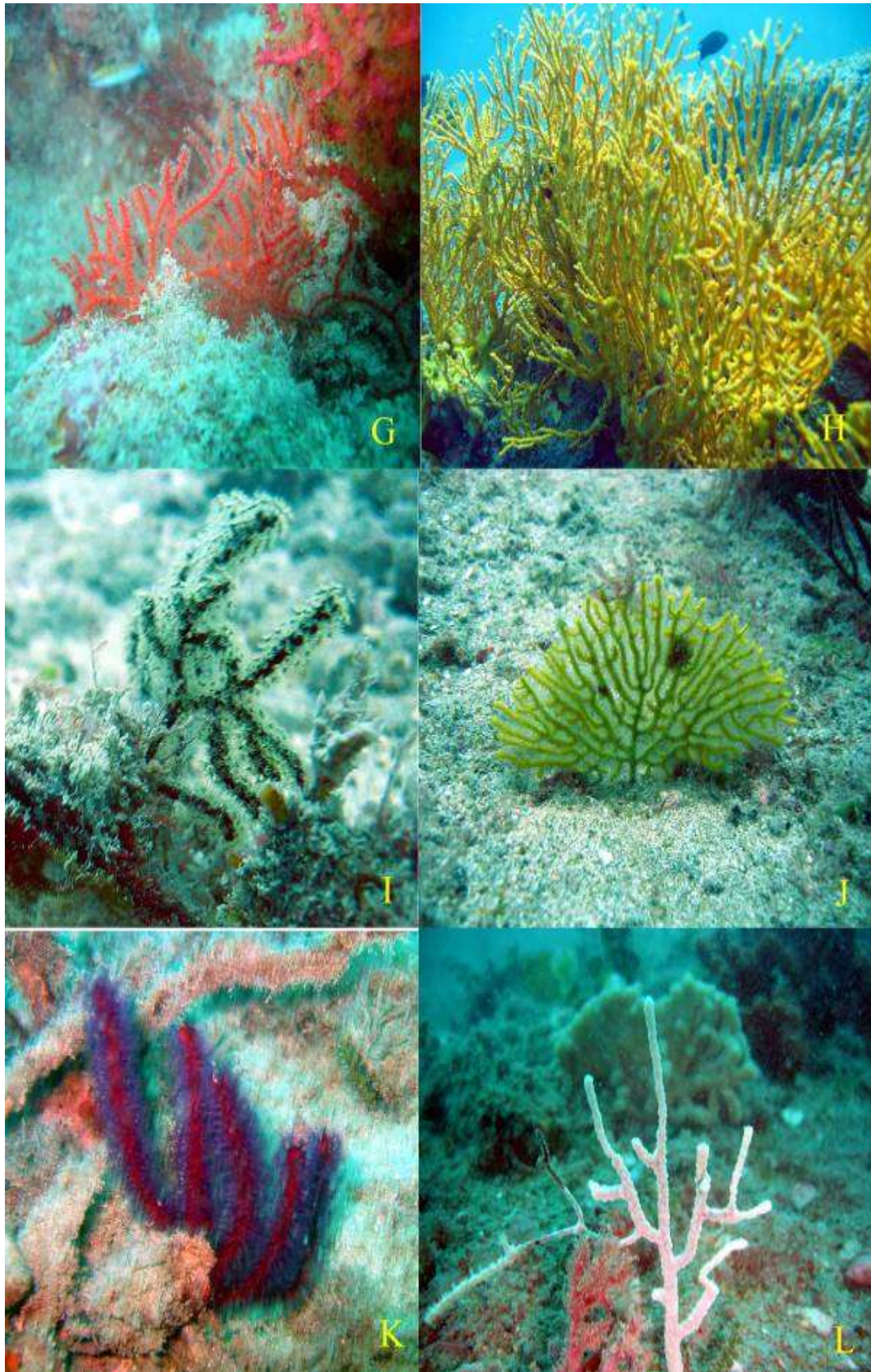


Figure 2 G- *Acabaria* sp., H- *Melithaea* sp., I - *Astrogorgia* sp., J - *Echinogorgia* sp., K, L- *Echinomuricea* sp.



Figure 3 M, N - *Menella* sp., O - *Paracis* sp., P, Q - *Annella reticulata*, R - *Subergorgia suberosa*.

Maximum percentages of gorgonians were observed in Mainland (18.25%) and it was followed by Van Island (10.63%), Upputhanni Island (10%), Nallathanni Island (10%), Koswari Island (9.38%), Pulivinichalli Island (8.75%) and Kariyachalli Island (6.25%) respectively. More life form cover was noted in Pulivinichalli Island (68.75%) of the Vembar groups and minimum was in Mainland (51.25) and Van Island (52.62%). A higher value of abiotics was observed in Van Island (36.75%), Koswari Island (35.12%), and Kariyachalli Island (33.75%), while all other islands had low percentage of abiotic cover (Table 2). The density showed that *Juncella*, *Subergorgia*, *Heterogorgia*, *Echinogorgia* were the dominant genus followed by *Annella*, *Menella*, *Muricella* *Ellisella*, *Echinomuricea*, *Dichotella*, *Astrogorgia*, *Acabaria*, *Melithaea* and *Paracis* respectively (Table 3).

Table 2 :Total coverage (%) of gorgonian surveyed in Thoothukudi and Vembar groups of Island

Study site	Gorgonian cover (%)	Total life form cover (%)	Total abiotic cover (%)
Van	10.63	52.62	36.75
Koswari	9.38	55.5	35.12
Kariyachalli	6.25	60	33.75
Upputhanni	10	60.63	29.37
Pulivinichalli	8.75	68.75	22.5
Nallathanni	10	61.75	28.25
Mainland	18.25	51.25	30.5

Table 1: List of Gorgonians identified on each island during the study period

Species	Van	Koswari	Kariyachalli	Upputhanni	Pulivinichalli	Nallathanni	Mainland
<i>Heterogorgia</i> sp.	+	+	+	+	+	+	+
<i>Muricella</i> sp.	-	+	+	+	-	+	+
<i>Dichotella</i> sp.	+	-	-	-	-	+	+
<i>Ellisella</i> sp.	-	+	-	-	+	-	+
<i>Juncella jencea</i>	+	+	+	+	+	+	+
<i>Acabaria</i> sp.	-	-	-	+	-	-	-
<i>Melithaea</i> sp.	-	-	-	+	-	-	-
<i>Astrogorgia</i> sp.	-	-	+	-	-	-	-
<i>Echinogorgia</i> sp.	+	+	+	+	+	+	+
<i>Echinomuricea</i> sp.	-	-	+	+	+	-	+
<i>Menella</i> sp.	+	-	+	+	+	+	+
<i>Paracis</i> sp.	-	-	-	-	-	+	-
<i>Annella reticulata</i>	+	+	-	+	+	+	+
<i>Subergorgia suberosa</i>	+	+	+	+	+	+	+

+ Present, - Absent

Table 3: Percentage of species coverage in each island during the study period

Genus	Van (%)	Koswari (%)	Kariyachalli (%)	Upputhanni (%)	Pulivinichalli (%)	Nallathanni (%)	Mainland (%)
<i>Acabaria</i>	0	0	0	0.84	0	0	0
<i>Annella</i>	0.82	0.82	0	0.16	0.06	0.8	1.2
<i>Astrogorgia</i>	0	0	0.06	0	0	0	0
<i>Dichotella</i>	0.45	0	0	0	0	0.4	0.45
<i>Echinogorgia</i>	2.5	1.81	1.4	0.93	1.4	2.1	2.31
<i>Echinomuricea</i>	0	0	1.2	1.81	0.92	0	1
<i>Ellisella</i>	0	1.2	0	0	0.62	0	1.2
<i>Heterogorgia</i>	1.2	0.8	0.06	0.94	0.25	0.82	3
<i>Juncella</i>	2.21	1.25	1.25	2.16	2.25	2.2	2.26
<i>Melithaea</i>	0	0	0	0.06	0	0	0
<i>Menella</i>	1.2	0	0.82	1.25	1.15	0.9	1.2
<i>Muricella</i>	0	0.25	0.62	0.86	0	0.2	0.23
<i>Paracis</i>	0	0	0	0	0	0.06	0
<i>Subergorgia</i>	2.25	3.25	0.84	0.99	2.1	2.52	5.4

In the present study, calculated that a comprehensive underwater study needs to be undertaken to bring to light the precise climatic condition and anthropogenic impact on the corals. The occurrence of gorgonians in the sub-tidal and deep water also warrants the need for conducting further detailed studies. The reefs of the Gulf of Mannar are being stressed by anthropogenic disturbances such as destructive fishing practices, domestic and industrial pollution, coral mining, coastal development activities such as salt pans, aquaculture practices and so on. The islands in Thoothukudi and Vembar groups have been hazardously damaged for the past few decades by the industrial development around the islands¹⁴⁻²⁰.

CONCLUSION

Our knowledge on Indian gorgonians is yet very poor. The lack of comprehensive studies created large gaps in our knowledge on the distribution of gorgonians in India. Detailed intensive survey is needed for improve our species inventory. Hence a close watch is needed to protect the reliable resources of nature that is found in the Gulf of Mannar. The local population especially the fisher folk should be educated regarding the values of corals and theirs importance in marine ecosystem.

ACKNOWLEDGEMENTS

Authors wish to thank Sri. Senbagamoorthy, Department of Forest, Ramnad District; Mr. Malkani, Director, Mr. Naganathan IFS, Eco Development Officer, Gulf of Mannar Biosphere Reserve Trust for the help and permission accorded to survey the Islands. Authors also wish to express their sincere gratitude to the staff and Executive Director Mr. Rajendraprasad of Peoples Action for Development, Vembar, Thoothukudi for thesis help in field surveys.

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