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Research article

Distribution and diversity of Macroalgae in the Andaman region, India

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Abstract: Andaman is under one of the nine union territories of India, containing 572 islands and it covers nearly 6498 km^2. These Islands form an archipelago in Bay of Bengal between India to the West and Myanmar to the north and east situated in between 6º N to 14º N latitude and 92º E to 94º E longitude, Once a hill range extending from Myanmar to Indonesia, these quaint undulating islets are cover with dense and evergreen forest and endless varieties of exotic flora and fauna. Present communication deals with sixteen taxa, represented by nine genera under Chlorophyceae, Phaeophyceae and Rhodophyceae from twelve stations of north and south Andaman.

Keywords: Seaweeds - Diversity - Distribution significance - Andaman.

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INTRODUCTION

Seaweeds are the major significant plants in marine ecosystem. These cryptogams are the only plants that can grow vigorously and act as keystone species in this respective niche. They are not only the producer in the ecological pyramid, they have or more significant role, they are the major source of phycocolloid, nutrients, fodder, fertilizer, food or more (Chennubhotla *et al.* 1987). Seaweeds are rich in minerals, trace elements, protein, vitamins and many more bioactive molecules. These all macroalgae have great impact on commercial as well as their distributional aspects. The uses of marine algae from ancient time (Tseng 2004) still it is relevant and fulfills our demand. The seaweed production potential in India is estimated at 1005000 ton with 300000 ton of potential in Andaman and Nikobar Islands (Narayanakumar & Krishnan 2011). Great contribution have been done in Indian seaweeds by Srinivasan (1969, 1973), Krishnamurthy & Joshi (1970), Baluswami *et al.* (1982), Silva *et al.* (1996), Rao & Mantri (2006) and Jha *et al.* (2009). Seaweeds of Andaman and Nicobar Island have been worked by Gopinathan & Panigrahy (1983), Iyenger (1984), Rao (1987), Srivastava & Mehrotral (1990), Jagtap (1992), Rao & Mudgal (1997), Rao (2000), Muthuvelan *et al.* (2001), Raviendran *et al.* (2010), Palanisamy (2012) and Mohanraju & Pujari (2012). Some important seagrasses have been reported of these islands by Das (1996). These seagrasses are basically SAM plant belonging to monocyledonous under Hydrocharitaceae and Potamogetonaceae. Seaweeds are important renewable resources in respective ecosystem. The present study explores the diversity and distribution of macroalgae from different localities of Andaman, which has great impact both economic and ecological point of view. Sustainable use and conservation strategies should be incorporate for these important plants.

MATERIALS AND METHODS

This study area covers both North and South Andaman, sampling were made at 12 stations covering Carbyn's cove beach, Ross Island, Chidiya Tapu, Neil Island, Bharatpur beach, Laxmanpur beach, Sitapur beach, Havelok Island, Radhanagar beach, Kalapathar beach (Fig. 1), Chatham and Barathang. The study was carried out during the month of February 2016. seaweeds were collected in the intertidal zone by hand pricking and few were by some algal nets. Spot photograph were taken by Nikon D3200 camera. Samples were preserved with 4% formalin using seawater. Temperature, pH, salinity and other ecological data were recorded at the period of sampling. Cross-section of the taxa were also done for internal details as required. GDF was used as mountant medium for the preparation of slides, Bando (1988). Identification have been carried out by the help of

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standard literature of mentioned earlier and others existing literature by web search.

Figure 1. A, Laxmanpur beach; **B**, Sitapur beach; **C**, Radhanagar beach; **D**, Kalapathar beach.

RESULTS AND DISCUSSION

In the present survey, nine genera with sixteen species were recorded from twelve stations of both South and North Andaman. Three classes were found, under chlorophyceae three order and four families Ulvaceae, Halimedaceae, Caulerpaceae and Cladophoraceae. Phaeophyceae and Rhodophyceae associated with two and three orders respectively (Table 1). Two families under Phaeophyceae, Dictyotaceae, and Sargassaceae. Three families under Rhodophyceae, these are, Gracilariaceae Nemaliaceae and Corallinaceae. Atmosphere temperature ranges from 18.5ºC to 29ºC and water temperature 17.6ºC to 27.8ºC. Salinity ranges from 29–32 ppm and pH were 7.6–8.0.

Table 1. List of the Taxa with respective Systematic Position.

Class	Order	Family	Taxa
Chlorophyceae	Ulvales	Ulvaceae	i) *Ulva reticulata* Forsskål
	Cladophorales	Cladophoraceae	i) *Chaetomorpha crassa* (C. Agardh) Kützing
	Bryopsidales	Caulerpaceae	i) *Caulerpa racemosa* (Forsskål) J.Agardh
			ii) *Caulerpa serrulata* (Forsskål) J.Agardh
		Halimedaceae	i) *Halimeda tuna* (Ellis & Solander) Lamouroux
			ii) *Halimeda macroloba* Decaisne
Phaeophyceae	Dictyotales	Dictyotaceae	i) *Padina boergesenii* Allender & Kraft
			ii) *Padina pavonica* (L.) Thivy
			iii) *Padina tetrastromatica* Hauck
	Fucales	Sargasssaceae	i) *Sargassum cinereum* J.Agardh
			ii) *Sargassum swartzii* Turn. C. Agardh
			iii) *Sargassum ilicifolium* (Turner) C.Agardh
Rhodophyceae	Gracilariales	Grasilariaceae	i) *Gracilaria debilis* (Forsskål) Børgesen
			ii) *Gracilaria corticata* (J. Agardh) J. Agardh
	Corallinales	Corallinaceae	i) *Amphiroa anceps* (Lamark) Decaisne
	Nemaliales	Nemaliaceae	i) *Tricleocarpa fragilis* (L.) Huisman & Townsend

Chlorophyceae

Four genera were recorded, *i.e. Ulva* (Fig. 2A), *Chaetomorpha* (Fig. 2B–D), *Caulerpa* (Fig. 2E, F) and *Halimeda* (Fig. 2G, H). *Caulerpa* is very promising among the different genera as mentioned. *Halimeda* with luxuriant growth followed by the *Caulerpa*. Chidiya Tapu, Laxmanpur beach, and Sitapur beach were the best places for the Chlorophycean seaweeds.

Phaeophyceae

Sargassum (Fig. 2I–K) and *Padina* (Fig. 2L) were the two gerera recorded from almost all the ten stations of

the South and North Andaman. *Sargassum* is quit very common on all submerged and open rock surface near the shore. More than two taxa have been recorded, biomass of this algae were very good. Brown algae are very good source of phycocolloid.

Rhodophyceae

Three genera were recorded namely *Gracilaria* (Fig. 2M, N), *Amphiroa* (Fig. 2O–Q) and *Tricleocarpa* (Fig. 2R, S). Apart from *Gracilaria* other algae were not common in all station, most of the red algae were recorded from ChidiyaTapu, Sitapur beach, Havelok island and Kalapathar beach. Different species of *Gracileria* were also found in Havelok island.

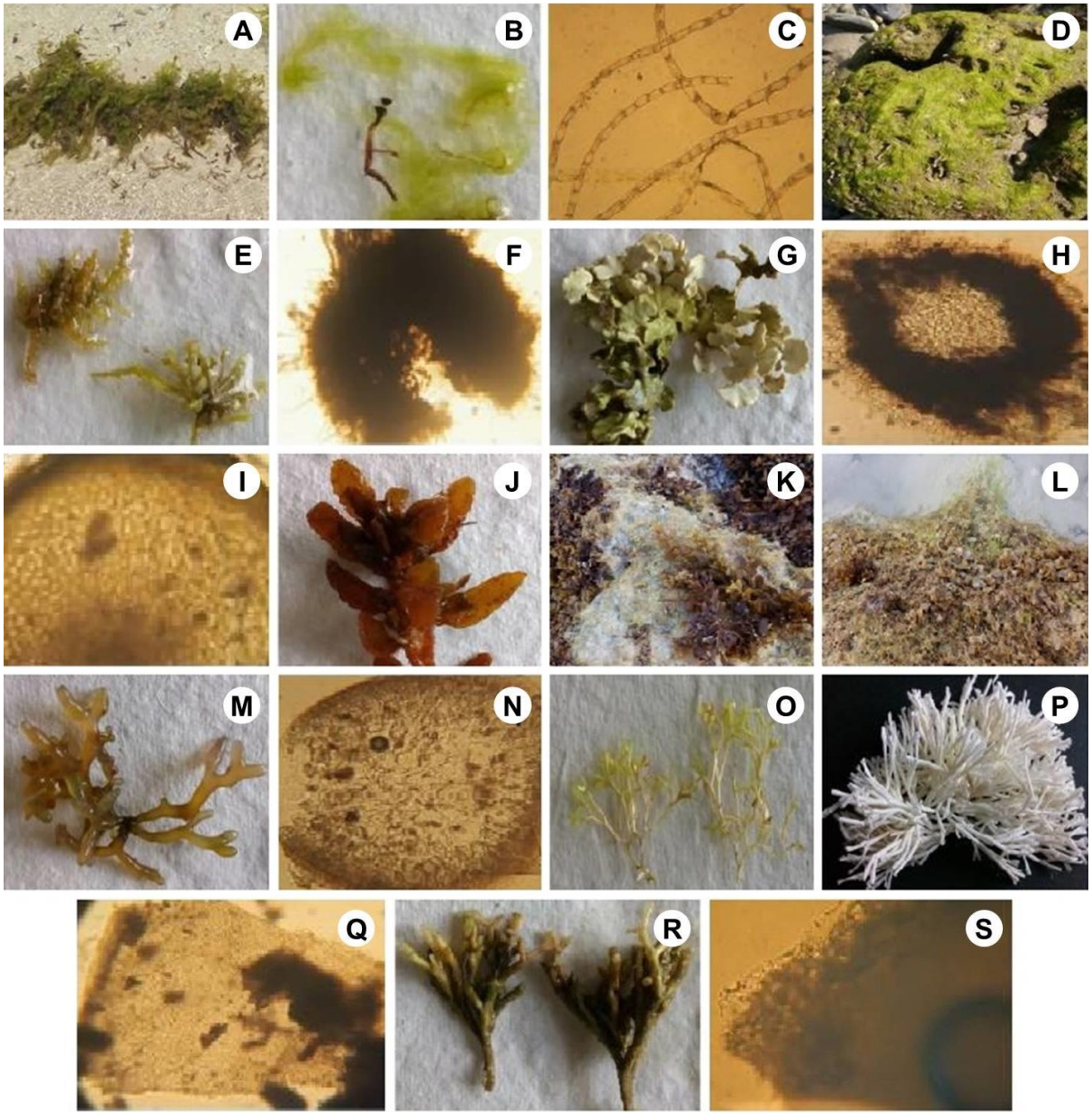

Figure 2. A, *Ulva reticulata* Forsskål; **B– D**, *Chaetomorpha crassa* (C. Agardh) Kützing; **E–F**, *Caulerpa racemosa* (Forsskål) J.Agardh; **G–H**, *Halimed atuna* (Ellis & Solander) Lamouroux; **I–J**, *Sargassum cinereum* J.Agardh; **K**, *Sargassum ilicifolium* (Turner) C.Agardh; **L**, *Padina boergesenii* Allender & Kraft; **M–N**, *Gracilaria debilis* (Forsskål) Børgesen; **O–Q**, *Amphiroa anceps* (Lamark) Decaisne; **R–S**, *Tricleocarpa fragilis* (Linnaeus) Huisman & Townsend.

CONCLUSION

During my survey, it was found that Diversity was more in rocky beaches than sandy beaches. Slightly submerged rocks were the best area for algal growth, *Caulerpa*, *Halimeda*, *Padina*, *Sargassum* were the best biomass producing alga among the rest. Small lagoons were also harbour good algal growth in comparison to normal sea. All these algae have good economic as well as ecological significance. Seaweeds are the only plants for restoration of marine ecosystem, so more emphases should be given for these important plants to fulfill our needs and demands.

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