

## SEAWEED RESOURCES

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## INTRODUCTION

The macroscopic algae comprising the three major classes Chlorophyceae (green algae), Phaeophyceae (brown algae) and Rhodophyceae (red algae), found mostly in the inter-tidal zone on the rocky coasts, are commonly referred as seaweeds. Recently their use as an industrial raw material in the production of agar and algin has created a great demand and attempts are under way to augment the resources by aquaculture practices. The Central Marine Fisheries Research Institute is playing a leading role in developing the techniques of seaweed culture in the Gulf of Mannar and Palk Bay. A gross picture of the seaweed resources along the coasts of mainland of India is available (Thivy, 1958; Rao, 1967, 1970).

Detailed surveys of seaweed resources have been carried out in different regions of the mainland: Mitra (1946) in Chilka Lake; Koshy and John (1948) along Travancore coast; Chacko and Pillai (1958) along Tamil Nadu coast; Rao *et al.* (1964), Chauhan and Krishnamurthy (1968) and Gopalakrishnan (1969) along Gujarat coast. More recently a collaborative survey was conducted by Central Marine Fisheries Research Institute, Central Salt and Marine Chemicals Research Institute and State Fisheries Department of Tamil Nadu, along the Tamil Nadu coast. To study the potential resources of seaweeds in the Andaman-Nicobar Islands, a preliminary investigation was conducted during January-April 1978 and the results are reported here.

## MATERIAL AND METHODS

In the present investigation, 42 stations were covered from Diglipur in the north to Campbell Bay in the south. Seaweeds in the intertidal zone were collected in fresh condition from 1 sq. m area of the sampling sites for the

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determination of the biomass. Complete plants with holdfast representing different genera and species were detached carefully and preserved for detailed examination in the laboratory. Samples from deeper zones were collected by diving. But in such cases, quantitative sampling could not be done. Taxonomic determination was made using the morphological characters and also the nature of the fruiting bodies.

## RESULTS

Altogether 55 species of seaweeds were collected from the Andaman-Nicobar Islands, of which 16 species belong to Chlorophyceae, 17 species to Phaeophyceae and 22 species to Rhodophyceae. The occurrence and distribution of these seaweeds are listed in the Annexure. Some of the species collected have been shown in Pl. I and II.

*Diglipur*: Harvestable quantities of alginophytes such as species of *Turbinaria* and *Sargassum* were noticed in the western side of Diglipur jetty, coastal areas of Table Island and the Ariel Bay as a whole. The agarophytes and other algal groups were poorly represented.

*Mayabunder*: In the Middle Andaman, Aves, Sound, Ray Hill and Stewart Islands were surveyed besides the coastal areas of Mayabunder. Most of the areas surveyed showed luxuriant growth of alginophytes such as *Padina*, *Turbinaria*, *Sargassum*, *Dictyota* and *Hormophysa*, especially at Oyster Point and German Jetty region of Mayabunder, western side of Ray Hill and Stewart Island. The harvestable quantity of agarophytes was found to be very poor.

*Rangat*: The seaweed vegetation was seen on the southern side of the Rangat jetty upto Nambuthalai at depths 1-3 m with the domination of alginophytes which were in harvestable quantities.

*Havelock*: In this section, Outram, Inglis, Sir William Peel, John Lawrence, Henry Lawrence and

Kyd islands were surveyed in addition to the coast of Havelock. Seaweed vegetation with harvestable quantities of alginophytes was found in the rocky intertidal area of Havelock and the lagoons of John Lawrence. The agarophytes were poorly represented.

*Neill* : The coastal areas of Neill and Sir Hugh Rose islands were surveyed. The rocky coasts have seaweeds with the domination of alginophytes, but were not in harvestable quantity.

*Chiriyatapu* : Seaweed vegetation was noticed in the coastal region of Macpherson strait towards Chiriyatapu point. *Padina* spp. were dominant but did not occur in harvestable quantity.

*Port Blair region* : The coastal areas of Corbyn's Cove, Sesostris Bay, Navy Bay, Phoenix Bay, North Bay, Shoal Bay, Viper Island, Ross Island, Bamboo-flat and Chatham Island were investigated. The shores of Corbyn's Cove and Phoenix Bay are rocky and have good algal vegetation. Harvestable quantity of alginophytes was noticed in Phoenix Bay. No good algal vegetation was found in the rest of the areas except Sesostris Bay and North Bay where *Ulva* spp. occur as drift weeds. The results of survey conducted in the Port Blair areas showed that generally the algae were not abundant and most of them were not in harvestable size.

*Little Andaman* : The Hut Bay and Butler Bay were surveyed. The algal zone is very much reduced due to the sandy nature of the shore. An approximate area of 15 ha was surveyed and estimate showed a potential of about 120 tonnes of fresh alginophytes from this area. Agarophytes such as *Laurencia papillosa*, *Gracilaria crassa*, *G. corticata* and *Halimeda peltata* were also seen as drift weeds in small quantities.

*Car Nicobar* : Almost the entire coast of this island was surveyed and algal vegetation was found to be poor. In the Sawai Bay, alginophytes such as *Padina*, *Dictyota*, *Turbinaria* and *Hormophysa* and agarophytes such as *Gracilaria* and *Laurencia* were found in the sandy beaches as drift weeds.

*Katchall* : The east and west bays of this island were surveyed and negligible quantities of seaweeds were seen on the sandy beaches as drift weeds. Here also the algal zone is very limited. In the West Bay, the high wave action on the coralline rocky shore prevents the seaweeds from thriving, whereas in the East Bay, near Kapanga jetty, small areas have a good algal vegetation comprising the species of *Amphiroa*, *Galaxaura*, *Turbinaria* and *Sargassum*.

*Camorta* : The Cross harbour and the Kakana regions were surveyed. Species of *Ulva*, *Halimeda*, *Laurencia* and *Gracilaria* were attached on the fringing corals and also found as drift weeds in the shore region. The algal zone is very limited due to the steep increase of depth and luxuriant growth of corals around the island.

*Nancowry* : In the Champin and Spiteful Bay regions, a few alginophytes such as *Sargassum*, *Turbinaria* and *Padina* were observed. The agarophytes were represented by few numbers and *Ulva* spp. occurred in patches.

*Trinkat* : Since the whole coastal area of this island has a luxuriant growth of fringing corals, the algal vegetation is very poor. On these coral reefs some of the attached forms such as *Gracilaria corticata*, *G. millardtii* and *Turbinaria conoides* could be seen, but not in harvestable quantity.

*Great Nicobar* : In the Campbell Bay region of Great Nicobar, in the vicinity of the jetty, Vijayanagar, Dilla-nalla and the coastal waters, *Turbinaria* spp., *Gracilaria* spp. and *Ulva lactuca* were noticed as drift weeds. They were not in harvestable quantity.

#### REMARKS

During the present investigation, it was noticed that the Andaman and Nicobar Islands have a domination of alginophytes such as species of *Turbinaria*, *Sargassum* and *Padina* and the economically important agarophytes such as *Gracilaria* spp., *Gelidiella acerosa* and *Gelidium* spp. were poorly represented. Further, the alginophytes except *Padina*, were all in young stages during January-April and, therefore, this period is not suitable for harvest. There appears to be only a limited scope for the exploitation and utilisation of the naturally available seaweed resources in the islands. However, attempts can be made for culture of alginophytes since the seeding material of this group of algae is available in plenty, especially in the Andaman group of islands. In this latter area, the lagoons of John Lawrence island near Havelock, Corbyn's Cove and Navy Bay regions of Port Blair and Macpherson strait at Chiriyatapu with sandy substratum offer excellent grounds for culture practices of seaweeds. In the Nicobar group, Sawai Bay of Car Nicobar, East Bay of Katchall and Spiteful Bay of Nancowry are the suitable places for seaweed culture.

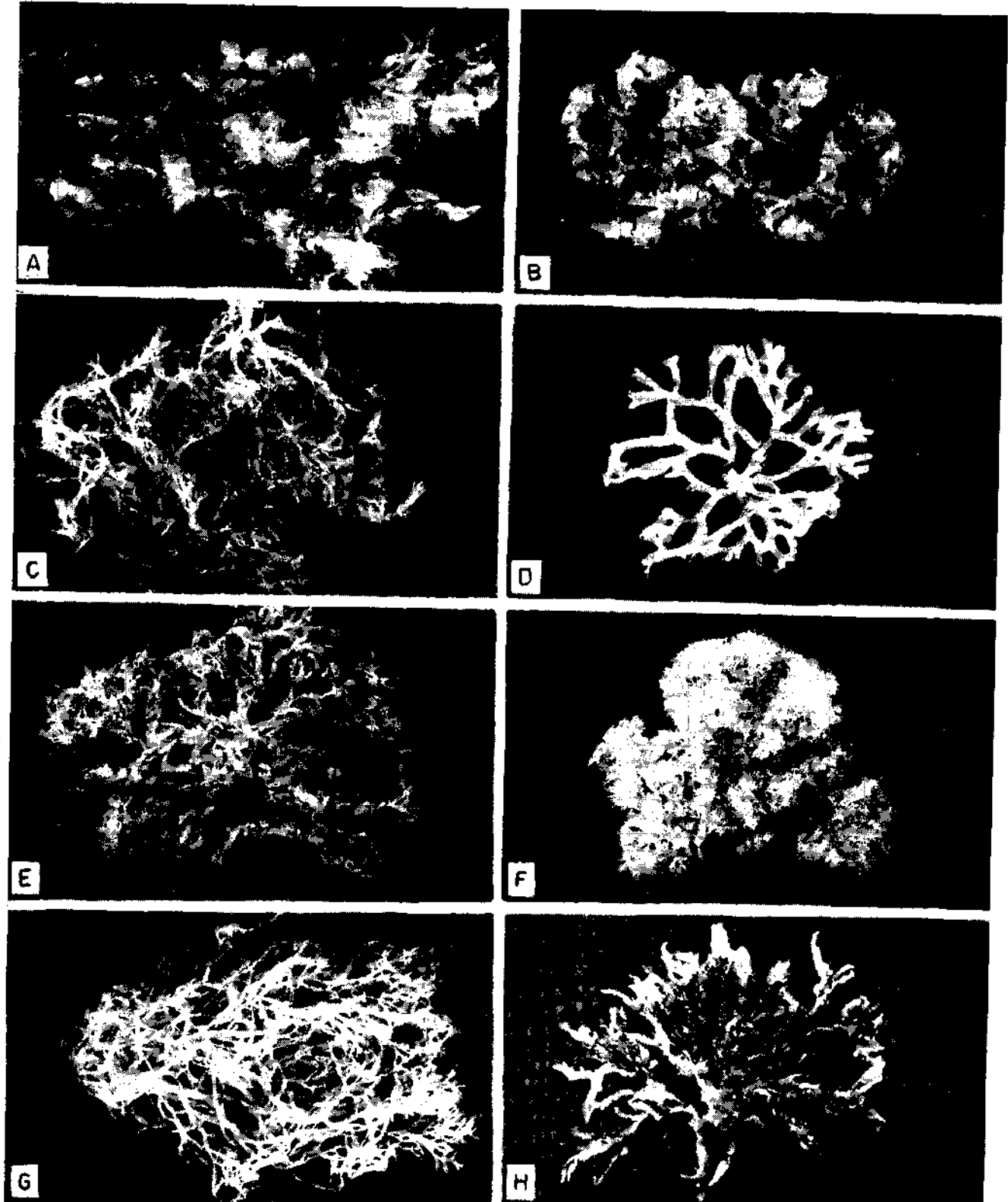


PLATE I. A. *Sargassum whitii*. B. *Turbinaria conoides*, both are algin yielding brown seaweeds. C. *Gracilaria edulis*. D. *Gracilaria crassa*. E. *Gracilaria foliifera*. F. *Gracilaria corticata* var. *cylindrica*. G. *Gracilaria corticata* var. *typica*. H. *Gracilaria millardetii*. C-H are agar yielding red seaweeds.

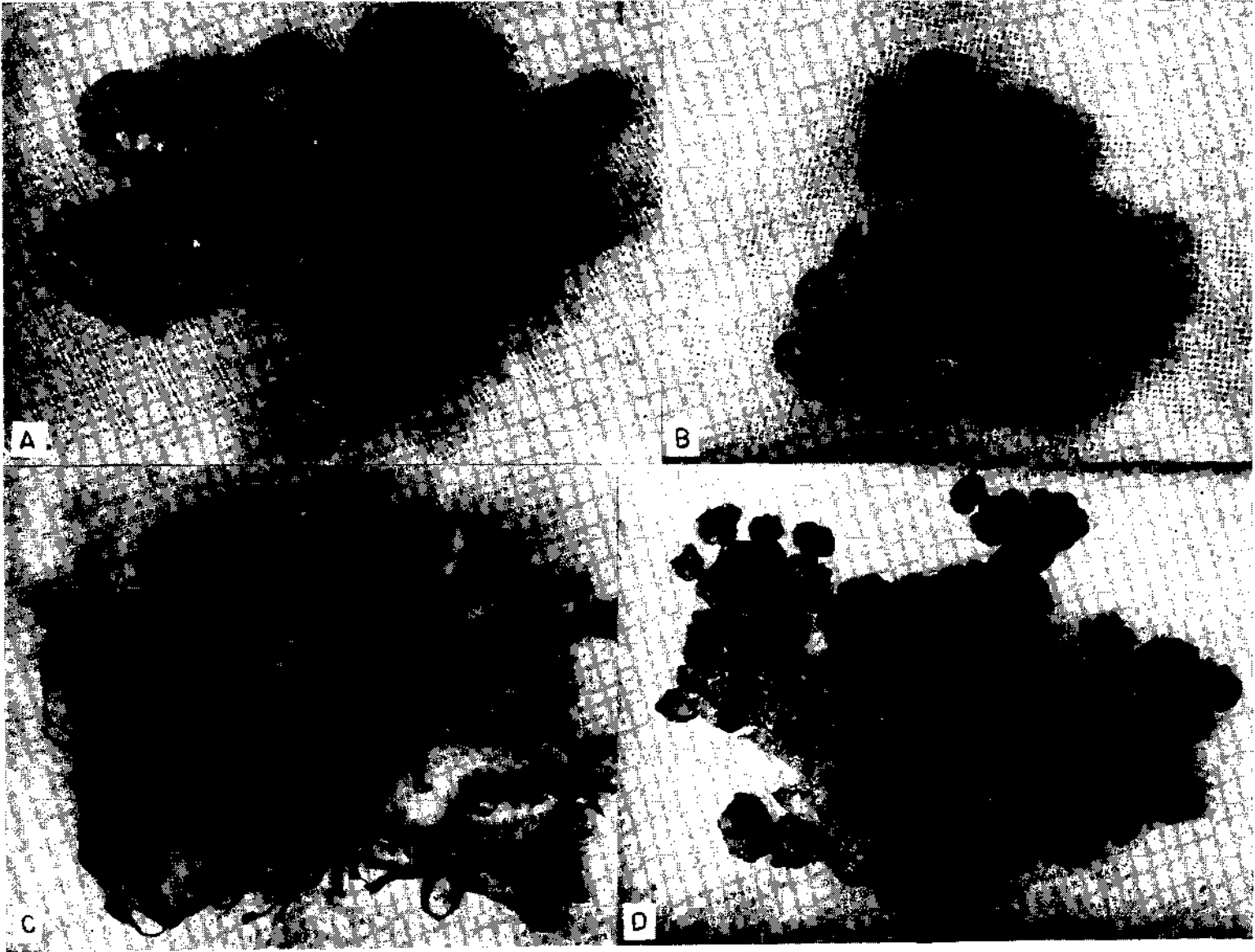


PLATE II. A. *Turbinaria ornata*. B. *Turbinaria dentata*. C. *Dictyota dichotoma*. D. *Halimeda peltata*.

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## ANNEXURE

### LIST OF SEAWEEDS COLLECTED FROM ANDAMAN-NICOBAR ISLANDS

Class : CHLOROPHYCEAE (Green Algae)

Order : ULOTRICHALES

Family : Ulotrichaceae

1. *Schizomeris leibleinii*  
Occurrence : Car Nicobar (Malacca) and Campbell Bay

Family : Ulvaceae

2. *Enteromorpha compressa* Greville  
Occurrence : Rangat, Mayabunder, Diglipur, Havelock, Neill, Hut Bay of Little Andaman, Port Blair and Car Nicobar
3. *Ulva lactuca* Linnaeus  
Occurrence : Neill, Havelock, Hut Bay, Port Blair, Car Nicobar, Camorta and Nancowry
4. *Ulva reticulata* Forskal  
Occurrence : Port Blair

Order : CLADOPHORALES

Family : Cladophoraceae

5. *Cladophora marina*  
Occurrence : Campbell Bay
6. *Ghaetomorpha antennina* Kuetzing  
Occurrence : Port Blair, Neill, John Lawrence, Car Nicobar

Order : SIPHONALES

Family : Caulerpaceae

7. *Caulerpa cupressoides* Weber-Van Basse  
Occurrence : Havelock, Little Andaman
8. *Caulerpa peltata* (Turner) Lamouroux  
Occurrence : Port Blair, Neill
9. *Caulerpa racemosa* (Forsk.) J. Agardh  
Occurrence : Port Blair, John Lawrence, Neill, Little Andaman, Nancowry and Car Nicobar
10. *Caulerpa taxifolia* (Vahl) C. Agardh  
Occurrence : Mayabunder, Havelock, Neill, Port Blair
11. *Caulerpa sertularioides* (Gmelin) Howe  
Occurrence : Neill
12. *Caulerpa serrulata* (Weber-Van Bosse) Tseng  
Occurrence : Havelock, Rangat

Family : Codiaceae

13. *Codium tomentosum* (Hudson) Stackhouse  
Occurrence : Neill, Little Andaman, Port Blair
14. *Halimeda incrassata*  
Occurrence : Port Blair, Car Nicobar, Katchall and Camorta
15. *Halimeda peltata*  
Occurrence : Car Nicobar, Katchall and Camorta
16. *Halimeda discoideae*  
Occurrence : Camorta

Class : PHAEOPHYCEAE (Brown algae)

Order : DICTYOTALES

Family : Dictyotaceae

17. *Dictyota dichotoma* (Hudson) Lamouroux  
Occurrence : John Lawrence, Neill, Port Blair, Car Nicobar and Camorta
18. *Dictyota bartyressiana* Lamouroux  
Occurrence : John Lawrence, Neill
19. *Dictyota indica* Sonder  
Occurrence : John Lawrence
20. *Padina gymnospora* (Kuetzing) Vickers  
Occurrence : Rangat, Mayabunder, Stewart, Ray Hill, Diglipur, Havelock, Neill, Port Blair, Chiriyatapu, Burmanalla, Car Nicobar, Camorta and Campbell Bay
21. *Padina tetrasporomatica* Hauck  
Occurrence : Rangat, Mayabunder, Stewart, Ray Hill, Diglipur, Havelock, Neill, Port Blair, Chiriyatapu and Katchall

Order : PUNCTARIALES

Family : Punctariaceae

22. *Hydroclathrus clathratus* (Bory) Howe  
Occurrence : Neill, Port Blair

Order : FUCALES

Family : Sargassaceae

23. *Hormophysa triquetra* (Linnaeus) Kuetzing  
Occurrence : Rangat, Mayabunder and Nancowry
24. *Sargassum wightii* (Greville) J. Agardh  
Occurrence : Rangat, Port Blair, Stewart island, Katchall and Nancowry.
25. *Sargassum myriocystum* J. Agardh  
Occurrence : Stewart island, Port Blair, Diglipur and Katchall
26. *Sargassum tennerium* J. Agardh  
Occurrence : Stewart island
27. *Sargassum illicifolium* (Turner) J. Agardh  
Occurrence : Rangat, Stewart island, Diglipur and Port Blair
28. *Sargassum duplicatum* J. Agardh  
Occurrence : Rangat, Port Blair and Little Andaman

29. *Turbinaria ornata* (Turner) J. Agardh  
Occurrence : Rangat, Diglipur, Mayabunder, Port Blair, Car Nicobar and Campbell Bay
30. *Turbinaria conoides* (J. Agardh) Kuetzing  
Occurrence : Neill and Havelock
31. *Turbinaria decurrence* Borry  
Occurrence : Neill and Havelock
32. *Turbinaria turbinata* (Linnaeus) Kuetzing  
Occurrence : Havelock
33. *Turbinaria dentata*  
Occurrence : Katchall (E. bay)

Class : RHODOPHYCEAE (Red algae)

Order : GELIDIELES

Family : Gelidiaceae

34. *Gelidiella acerosa* (Forskal) Feldman and Hamel  
Occurrence : Port Blair, Car Nicobar and Katchall
35. *Gelidium heteroplatos* Boergesen  
Occurrence : Port Blair and Mayabunder
36. *Gelidium pusillum* (Stockhouse) Le Jollis  
Occurrence : Mayabunder, Port Blair, Little Andaman, Katchall, Camorta and Trinkat

Order : GIGARTINALES

Family : Gracilariaceae

37. *Gracilaria edulis* (Gmel) Silva  
Occurrence : Neill, Car Nicobar, Trinkat, Camorta, Nancowry and Campbell Bay
38. *Gracilaria crassa* (Harvey) J. Agardh  
Occurrence : Rangat, Mayabunder, Neill, Havelock, Little Andaman, Port Blair and Car Nicobar
39. *Gracilaria foliifera* (Forskal) Boergesen  
Occurrence : Neill, Mayabunder, Port Blair, Car Nicobar and Campbell Bay
40. *Gracilaria corticata* J. Agardh  
Occurrence : Mayabunder, Neill and Port Blair
41. *Gracilaria corticata* var. *cylindrica* Rao  
Occurrence : Car Nicobar and Katchall
42. *Gracilaria corticata* var. *typica* Rao  
Occurrence : Car Nicobar and Katchall

43. *Gracilaria verrucosa* (Hudson) Papenfus  
Occurrence : Little Andaman

44. *Gracilaria indica* Rao  
Occurrence : Car Nicobar

45. *Gracilaria millarditii* Rao  
Occurrence : Port Blair (Aberdeen)

Family : Hypneaceae

46. *Hypnea musciformis* J. Agardh  
Occurrence : Katchall (W. Bay)

Family : Gigartinaceae

47. *Chondrus crispus*  
Occurrence : Car Nicobar

Order : NEMALIONALES

Family : Helminthocladiaceae

48. *Lttagora ceranoides*  
Occurrence : Car Nicobar

Order : CRYPTONEMIALES

Family : Corallinaceae

49. *Amphiroa fragillissima*  
Occurrence : Port Blair

50. *Amphiroa rigida*  
Occurrence : Katchall (East and West Bay)

51. *Galaxaura oblongata*  
Occurrence : Port Blair, Car Nicobar and Katchall

Order : CERAMILES

Family : Ceramiaceae

52. *Centroceros clavulatum*  
Occurrence : Port Blair

53. *Ceramium avalona*  
Occurrence : Nancowry and Katchall

54. *Laurencia papillosa* (Forsk.) Greville  
Occurrence : Neill, Car Nicobar, Katchall,  
Camorta, Nancowry and Campbell Bay

55. *Laurencia obtusa* (Hudson) Lamouroux  
Occurrence : Little Andaman, Chiriyatapu and  
Neill.