

# Seaweeds of Bangladesh Coast

(Abundance, Distribution & Taxonomic List)



**Bangladesh Fisheries Research Institute**  
**Ministry of Fisheries & Livestock**



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# FOREWORD

## FOREWORD



Bangladesh is very rich in marine waters, which covers an area of 118,813 sq. km that is greater than the land area. Total continental shelf area covers roughly 66,400 sq. km and the EEZ spans 140,860 sq. km towards open sea, and its jurisdiction is up to 200 nautical miles seawards from the beach baseline. Bangladesh is one of the leaders (3rd in ranking) among the top 10 countries of the world for freshwater aquaculture. There are opportunities to initiate and introduce mariculture as well.

Under the vast tropical waters of Bay of Bengal there lies huge marine living resources which consist of fish, shellfishes, molluscs, elasmobranchs, marine algae etc. In Bangladesh, the natural abundance of seaweeds is reported from the southern part of the country and Saint Martin Island (Cox's Bazar) have enormous natural growth of seaweeds. Although the seaweed floras in Bangladesh coast are extensively found, they are relatively underutilized. In Cox's Bazar coast, the fishermen, women and their children are engaged in collecting seaweeds. Collected seaweeds are sun dried on shore and dried seaweeds are consumed by local tribal people. Generally coastal people of Bangladesh called seaweeds as 'Hazala' The study of seaweed resources is a very recent activity in Bangladesh and complete information and statistics in this regard is yet to discover. The taxonomic and ecological study of seaweeds, however, been a on-going activities.

Bangladesh Fisheries Research Institute (BFRI) through its Marine Fisheries & Technology Station (MFTS), Cox's Bazar initiated seaweed research from 2013 with the objectives of development of seaweed culture technique in Bangladesh; investigate the nutritious value of seaweeds; and utilization of seaweeds by producing value added products. The "Seaweeds of Bangladesh Coast" is the outcomes of extensive work of BFRI researchers in this regards. This book contains original pictures taken by BFRI scientists during the field trips carried out to various parts of the Cox's Bazar coast including Kuakata, Patuakhali as well as Sundarbans. I hope this book will be useful for students, researchers, teachers, nature lovers, scuba divers and people interested to marine life.

Yahia Mahmud PhD  
Director General

Green Seaweed,  
*Caulerpa racemosa*

Brown Seaweed,  
*Sargassum oligocystum*



Red Seaweed,  
*Hypnea musciformis*



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## Phaeophyta (Brown Seaweeds)

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## 5. REFERENCES



## 1. INTRODUCTION

Seaweeds regarded as a high profile commercial marine biota for its variety of uses, like raw materials of bio-chemicals (agar, agarose, carrageenan), dyes, food, feed, enzymes and drugs. In Bangladesh, naturally growing seaweeds are found in the littoral and sub-littoral zones of coastal areas. Around 200 species belonging to 77 genera of seaweeds have so far been recorded from the major resources of Cox's Bazar coast of Bay of Bengal (Aziz 2015). These include 47 species of green seaweeds, 59 species of brown seaweeds, and 94 species of red seaweeds. In most cases, natural growing seaweeds of Cox's Bazar coast goes to markets of neighboring country like Myanmar with some domestic consumption by local tribal people. In recent years, sea weed has been an issue all over the world. In contrast to Govt. vision on Blue Economy, culture of seaweed is a maiden concept for the coastal people of Bangladesh. Bangladesh Fisheries Research Institute through its Marine Fisheries & Technology Station at Cox's Bazar started comprehensive seaweed resources investigation and culture study in 2013, although first study on seaweed culture was initiated in 2007 by the Institute of Marine Sciences of University of Chittagong (Zafar 2007). Culture of seaweed along Cox's Bazar coast added a new dimension of prospect and possibility of seaweed mariculture in Bangladesh coast (Islam et al. 2017).

During the last decade, the seaweed products (Phycocolloids) industry has grown rapidly and is placed at 1.5 billion US\$ and the demand for seaweeds and their products has been increasing, approximately at 10% per annum. Increasing investments in end-use segments, such as agriculture and animal feed, are expected to drive product demand in the coming years. The dry-matter composition of seaweeds ranges from 10-30% protein, with red and green seaweeds typically higher than browns (Kim 2012). More than 80% of the demand for seaweed in 2015 was from Asia Pacific and the region is forecasted to witness the highest growth of more than 9% during 2015-24 (GVR 2018). Ensuring food security is a big challenge for over populated country like Bangladesh. Cultivable agricultural land decreases day by day for urbanization and industrial growth. In this context, alternative renewable food source is of prime importance. Therefore, exploring of marine resources would be the important options to ensure the nutritional security for large number people in the country. Seaweed may be used as a good source of food that also reduce the pressure on staple food like rice. The expansion of seaweed farming in the country could have positive impacts on local coastal poverty, ecosystem management and climate change mitigation. Govt. of Bangladesh already identified seaweed as a major mariculture component in its ongoing national development plans and targeting SDGs of UN.



## 2. HOW SEAWEED CONTRIBUTED TO BLUE ECONOMY OF BANGLADESH

The fisheries sector is important for Bangladesh's overall food security and economic growth. Moreover, coastal aqua farming strikingly emerged in the country as a potential sector that can contribute immensely to coastal prosperity and earning of foreign exchange. In Bangladesh, the natural abundance of seaweeds are reported from the south-eastern part of the mainland and offshore island, the St. Martin Island having rocky substratum and are suitable for natural growth of seaweeds. Although the seaweed flora of St. Martin's Island in Bangladesh are extensive, yet they are relatively underutilized. Seaweeds are also found in Sundarbans coast and Kuakata areas of Patuakhali region. Whereas the general mass of Bangladesh do not know that the seaweeds can be used as human food. On the other hand, seaweeds are traditionally consumed in the orient as part of the daily diet. Human consumption of green algae (5%), brown algae (66.5%) and red algae (33%) is high in Asia, mainly in Japan, China and Korea (Dawes 1998).

### 2.1 Goals and strategies during 7th FYP Period (2016-2020)

The Five Year Plan for the period 2016 to 2020 is a national landmark policy document in a participatory and inclusive manner that governs the development interventions in the public sector and provide direction to the overall national development for a period of 5 years. As a continuous process of national planning, 7th FYP emphasizes on policies, instructions and programmes that will support lowering of income inequality and empowering the citizens. The timeframe of 7th FYP coincides with the final year of MDGs (Millennium Development Goals) and the launch of UN's post-2015 Sustainable Development Goals (SDGs) which ultimately provide the Govt. to initiate implementation of SDGs, while addressing some agenda of MDGs. The development vision for agriculture (including fisheries sub-sector) under the 7th FYP is to ensure food and nutritional security, enhancement of sustainable intensification and diversification of climate resilient agricultural production, and livelihood improvement through technological innovations and use, value addition of agricultural products, and linking farming community with markets, both local and global.

Seaweeds has great value in providing low-cost, wholesome nutrition and therapeutic protection. However, seaweeds industry in Bangladesh is at its infancy stage. It is not widely adopted as food due to technological and socio-economic constraints and shortage of skill manpower for wild seaweeds harvesting. The 7th FYP however emphasizes to develop technologies for the cultivation of commercially important seaweed stocks through research. In addition, culture of high value seaweeds should be aimed, as a part of integrated coastal development programme. In order to establish a comprehensive plan for sustainable conservation, management and exploitation of resources from the sovereign marine waters as well as explore the new opportunities of Blue Economy the present status of fisheries resources and its future potential for the national economy need to be framed out. The strategies and actions under 7th FYP included promote development of technology for production of seed for culturing marine fish and seaweeds in Bangladesh coast.

## 2.2 Mapping of Govt. Ministries by targets in the implementation of SDGs aligning with 7th FYP

The initiation of Agenda 2030 (SDGs) implementation with the development approach of Bangladesh underlying in the 7th FYP is integrated with the SDGs by targets. The plan strives for just, equitable and inclusive economic growth with appropriate measures for protection of the environment. At the behest, an inter-ministerial committee, "SDG Monitoring and Implementation Committee" which includes 16 key implementing ministries was formed under Prime Minister Office. Under the supervision of this committee all the ministries/divisions were consulted several times to prepare a mapping document. Under SDG goal 14.4 development of technology for production of seed for culturing marine fish and seaweeds are highlighted. SDGs, officially known as "Transforming our world: the 2030 Agenda for Sustainable Development" is a set of 17 "Global Goals" that must be achieved considering the rights of the human being to a healthy and productive environment. Out of 17, 6 goals (Goals 2, 3, 6, 7, 13 and 14) could be achieved from seaweed resources.



Fig. 1. SDGs relationship with seaweed.

Food security and improved nutrition are the major concerning issues of zero hunger (Goal 2). Seaweeds would be an important commodity against hunger as source of food. Seaweeds contains good numbers of bioactive compounds which serve as medicinal ingredients for diabetes, cancer and hypertension (Goal 3). Seaweeds has large affinity for removal of toxic and is a perfect bio purifier (Goal 6). Cost effective, affordable as well as environmental- friendly biofuels could be produced from seaweeds (Goal 7). High level of CO<sub>2</sub> emission and consequently global warming are the main challenge in the world, where seaweeds could mitigate climate vulnerability in Bangladesh coast (Goal 13). And lastly Goal 14 deals with life below water- ultimate destination of seaweeds.

### 3. SEAWEEDS DISTRIBUTION IN BANGLADESH COAST

A total of 117 species of seaweeds belonging to 62 were red (Rhodophyta), 31 were brown (Phaeophyta) and 24 were green (Chlorophyta) group reported from the south-eastern and south-western coasts of Bangladesh (Table 1, Fig. 2). Rhodophyta group contributed 52.99% species, Phaeophyta group 26.50% species and Chlorophyta group 20.51% species in the Bangladesh coast (Fig. 3).

□

Table 1. List of seaweeds collected from the Bangladesh coast

Taxonomic groups	Chlorophyceae	Phaeophyceae	Rhodophyceae	Total
Order	03	05	13	21
Families	06	05	21	32
Genera	08	10	38	56
Species	24	31	62	117

Fig. 2. Map showing seaweeds in Bangladesh coast.



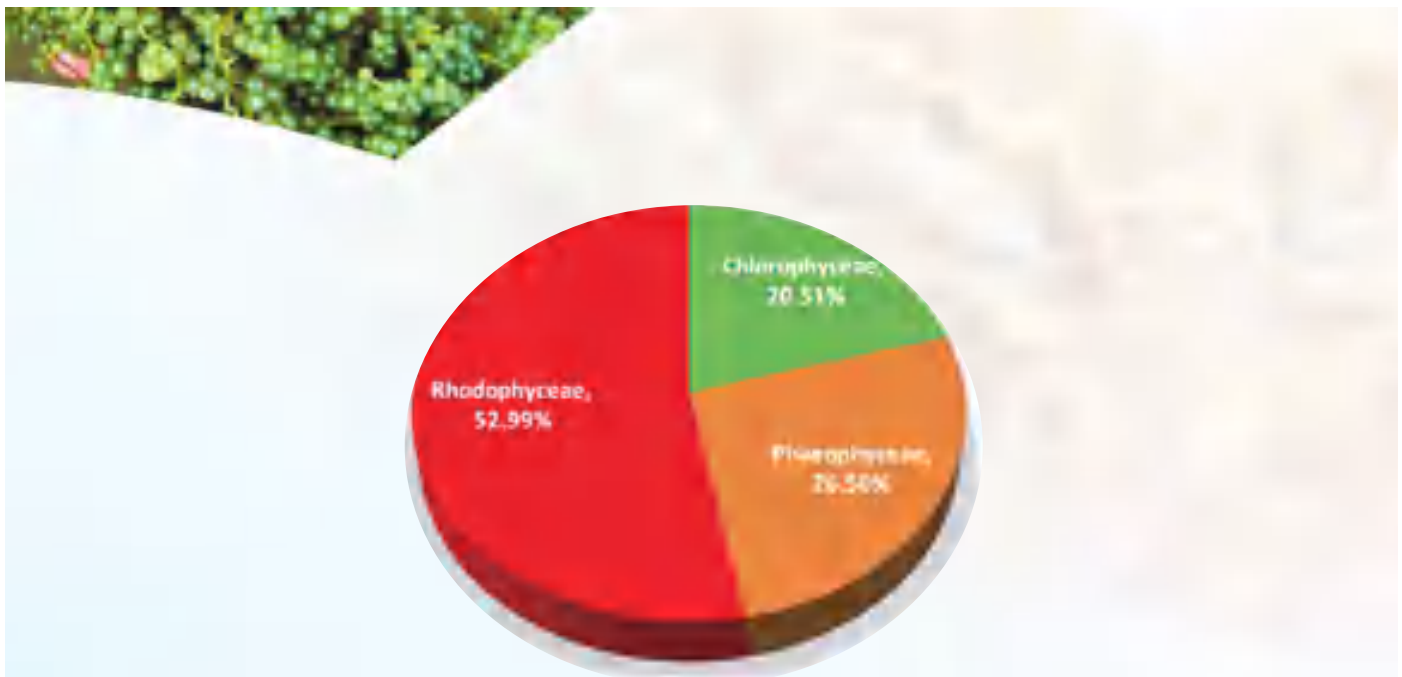


Fig. 3. Class wise distribution percentage of seaweeds biodiversity in Bangladesh.

Some researcher reported total 197 species of seaweeds belonging to 95 are red (Rhodophyta), 46 green (Chlorophyta) and 56 brown (Phaeophyta) group occurring on Bangladesh coast. About 35 taxa of marine red algae and 45 taxa under 17 genera of green algae so far have been reported from Bangladesh coasts (Aziz 2015).

Saint Martin Island under Cox's Bazar is a sandy and rocky bottom, protected by the coral reef with slanting; wave action is weak, which supported a favorable environment for several seaweed species. Presence of rocky substratum and geographical position of St. Martin Island causes variation in the distribution of seaweeds in St. Martin's Island. The highest numbers of seaweeds taxa were found at the Saint Martin Island sites (Tables 2, 3 & 4). This might be a result of stable hydrology and rocky bottom structure which support the enormous growth of seaweeds. In contrast, the least diversity was found at Teknaf, Inani, Bakkhali, Sonadia, Sundarbans and Kuakata, where there were soft bottom substrate (sandy to muddy bottom) and high turbidity. The high turbidity is known to cut down the light intensity that decreases the photosynthetic ability in both seaweeds and seagrasses. It is also known to decrease the ability of spore settlements and growth of macroalgae. Highest abundance of seaweeds in St. Martin Island may be the result of greater light intensity, resulting in increased photosynthesis and growth of macroalgae. On the other hand, Teknaf, Bakkhali, Inani, and Sonadia are located in the upstream, where, the magnitude of water quality parameters does not remain stable like St. Martin and does not have a vast substratum facility to form an enormous colony of seaweeds. The salinity of seawater is very prudent and potential factor to grow seaweeds, as it is the key determinate of osmotic balance. It was observed the lower growth of *Hypnea* sp. from St. Martin when salinity dropped below 24 ppt and better growth reported when salinity increased (>30 ppt). Salinity ranged from 27-33 ppt along St. Martin, Inani and Bakkhali sites which did not deplete below 30 ppt in St. Martin. It suggests that a stable and moderate salinity as one of the key factors for having highest biomass in St. Martin. On the other hand, Sundarbans and Kuakata represented low salinity zone. □





Table 2. Distribution of Green algae/Chlorophyta

Sl. No.	Name of Seaweeds	Sampling sites				
		Saint Martin	Teknaf	Inani	Bakkhali	Sonadia
1	<i>Caulerpa macrophysa</i> (Sonder ex Kützing) G. Murray, 1887		-	-	-	-
2	<i>Caulerpa mexicana</i> Sonder ex Kützing, 1849		-	-	-	-
3	<i>Caulerpa peltata</i> J.V. Lamouroux, 1809		-	-	-	-
4	<i>Caulerpa racemosa</i> (Forsskål) J. Agardh, 1873		-	-	-	-
5	<i>Caulerpa sertularioides</i> (S.G.Gmelin) M. Howe, 1905		-	-	-	-
6	<i>Caulerpa taxifolia</i> (M. Vahl) C. Agardh, 1817		-	-	-	-
7	<i>Chaetomorpha aerea</i> (Dillwyn) Kützing, 1849					
8	<i>Cladophora herpestica</i> (Montagne) Kützing, 1849	-	-	-		
9	<i>Cladophora laetevirens</i> (Dillwyn) Kützing, 1843		-	-	-	-
10	<i>Codium fragile</i> (Suringar) Hariot, 1889		-	-	-	-
11	<i>Enteromorpha compressa</i> (Linnaeus) Nees, 1753					
12	<i>Enteromorpha intestinalis</i> (Linnaeus) Nees, 1753					
13	<i>Enteromorpha torta</i> (Mertens) Reinbold, 1893					
14	<i>Halimeda discoidea</i> Decaisne, 1842		-	-	-	-
15	<i>Halimeda gracilis</i> Harvey ex J. Agardh, 1887		-	-	-	-
16	<i>Halimeda minima</i> (W.R. Taylor) Hillis-Colinvaux, 1968		-	-	-	-
17	<i>Halimeda opuntia</i> (Linnaeus) J.V. Lamouroux, 1816		-	-	-	-
18	<i>Halimeda tuna</i> (J. Ellis & Solander) J.V. Lamouroux, 1816		-	-	-	-
19	<i>Ulva compressa</i> Linnaeus, 1753	-		-		
20	<i>Ulva conglobata</i> Kjellman, 1897	-		-		
21	<i>Ulva fasciata</i> Delile, 1813		-		-	
22	<i>Ulva lactuca</i> Linnaeus, 1753		-		-	
23	<i>Ulva reticulata</i> Forsskål, 1775					
24	<i>Valoniopsis pachynema</i> (G. Martens) Børgesen, 1934	-	-		-	-

Table 3. Distribution of Brown algae/Phaeophyta

Sl. No.	Name of Seaweeds	Sampling sites				
		Saint Martin	Teknaf	Inani	Bakkhali	Sonadia
1	<i>Colpomenia peregrina</i> Sauvageau, 1927		-	-	-	-
2	<i>Colpomenia ramosa</i> W.R. Taylor, 1945			-	-	-
3	<i>Colpomenia sinuosa</i> (Mertens ex Roth) Derbès & Solier, 1851			-	-	-
4	<i>Dictyota atomaria</i> (Woodward) Greville, 1830		-	-	-	-
5	<i>Dictyota ciliolata</i> Sonder ex Kützing, 1859		-	-	-	-
6	<i>Dictyota dichotoma</i> (Hudson) J.V. Lamouroux, 1809		-	-	-	-
7	<i>Dictyota flabellata</i> (Collins) Setchell & N.L. Gardner, 1924		-		-	-
8	<i>Dictyota menstrualis</i> (Hoyt) Schnetter, Hörning & Weber-Peukert, 1987		-	-	-	-
9	<i>Dictyota patens</i> J. Agardh, 1882			-	-	-
10	<i>Ectocarpus siliculosus</i> (Dillwyn) Lyngbye, 1819		-		-	-
11	<i>Hydroclathrus clathratus</i> (C. Agardh) M. Howe, 1920		-	-	-	-
12	<i>Hydroclathrus tenuis</i> C.K. Tseng & Lu Baroen, 1983		-	-	-	-
13	<i>Padina antillarum</i> (Kützing) Piccone, 1886		-	-	-	-
14	<i>Padina australis</i> Hauck, 1887		-	-	-	-
15	<i>Padina boryana</i> Thivy, 1966		-	-	-	-
16	<i>Padina fraseri</i> (Greville) Greville, 1830		-		-	-
17	<i>Padina gymnospora</i> (Kützing) Sonder, 1871		-	-	-	-
18	<i>Padina pavonica</i> (Linnaeus) Thivy, 1960		-	-	-	-
19	<i>Padina tetrastromatica</i> Hauck, 1887		-		-	-
20	<i>Ralfsia fungiformis</i> (Gunnerus) Setchell & N.L. Gardner, 1924		-	-	-	-
21	<i>Rosenvingea intricata</i> (J. Agardh) Børgesen, 1914		-	-	-	-
22	<i>Rosenvingea orientalis</i> (J. Agardh) Børgesen, 1914	-		-	-	-
23	<i>Rosenvingea sanctae-crucis</i> Børgesen, 1914	-		-	-	-
24	<i>Sargassum arnaudianum</i> Montagne, 1850		-		-	-
25	<i>Sargassum filipendula</i> C. Agardh, 1824		-	-	-	-
26	<i>Sargassum ilicifolium</i> (Turner) C. Agardh, 1820		-	-	-	-
27	<i>Sargassum myriocystum</i> J. Agardh, 1848		-	-	-	-
28	<i>Sargassum oligocystum</i> Montagne, 1845		-		-	-
29	<i>Sargassum platycarpum</i> Montagne, 1842		-	-	-	-
30	<i>Spatoglossum asperum</i> J. Agardh, 1894		-	-	-	-
31	<i>Styopodium zonale</i> (J.V. Lamouroux) Papenfuss, 1940		-	-	-	-

Table 4. Distribution of Red algae/Rhodophyta

Sl. No.	Name of Seaweeds	Sampling sites				
		Saint Martin	Teknaf	Inani	Bakkhali	Sonadia
1	<i>Acanthophora spicifera</i> (M. Vahl) Børgesen, 1910		-	-	-	-
2	<i>Actinotrichia fragilis</i> (Forsskål) Børgesen, 1932		-	-	-	-
3	<i>Amphiroa cryptarthrodia</i> Zanardini, 1843		-	-	-	-
4	<i>Amphiroa fragilissima</i> (Linnaeus) J.V. Lamouroux, 1816		-	-	-	-
5	<i>Amphiroa rigida</i> J.V. Lamouroux, 1816		-	-	-	-
6	<i>Asparagopsis taxiformis</i> (Delile) Trevisan, 1845		-	-	-	-
7	<i>Bangia fuscopurpurea</i> (Dillwyn) Lyngbye, 1819				-	-
8	<i>Champia parvula</i> (C.Agardh) Harvey, 1853		-	-	-	-
9	<i>Chondrus crispus</i> Stackhouse, 1797	-	-	-	-	-
10	<i>Chrysymenia</i> sp, 1842		-	-	-	-
11	<i>Dermonema pulvinatum</i> (Grunow) Fan, 1962		-	-	-	-
12	<i>Dichotomaria obtusata</i> (J. Ellis & Solander) Lamarck, 1816		-	-	-	-
13	<i>Dudresnaya verticillata</i> (Withering) Le Jolis, 1863		-	-	-	-
14	<i>Eucheuma cottonii</i> Weber-van Bosse, 1913		-	-	-	-
15	<i>Eucheuma spinosum</i> J. Agardh, nom. illeg., 1852		-	-	-	-
16	<i>Galaxaura oblongata</i> (J. Ellis & Solander) J.V. Lamouroux, 1816		-	-	-	-
17	<i>Galaxaura rugosa</i> (J. Ellis & Solander) J.V.Lamouroux, 1816		-	-	-	-
18	<i>Ganonema pinnatum</i> (Harvey) Huisman, 2002	-	-	-	-	-
19	<i>Gelidium pusillum</i> (Stackhouse) Le Jolis, 1863		-	-	-	-
20	<i>Gracilaria corticata</i> (J.Agardh) J. Agardh, 1852	-	-	-	-	-
21	<i>Gracilaria tikvahiae</i> McLachlan, 1979	-	-	-	-	-
22	<i>Gracilaria verrucosa</i> (Hudson) Papenfuss, nom. rejic, 1950	-	-	-	-	-
23	<i>Grateloupia lanceolata</i> (Okamura) S. Kawaguchi, 1997		-	-	-	-
24	<i>Grateloupia livida</i> (Harvey) Yamada, 1931	-			-	-

25	<i>Halymenia dilatata</i> Zanardini, 1851		-	-	-	-
26	<i>Halymenia venusta</i> Børgesen, 1932		-	-	-	-
27	<i>Helminthocladia australis</i> Harvey, 1863	-	-	-	-	-
28	<i>Hildenbrandia rubra</i> (Sommerfelt) Meneghini, 1841		-	-	-	-
29	<i>Hydrolython onkodes</i> (Heydrich) Penrose & Woelkerling, 1992		-	-	-	-
30	<i>Hypnea cornuta</i> (Kützinger) J. Agardh, 1851				-	-
31	<i>Hypnea esperi</i> Bory, nom. illeg, 1828		-	-	-	-
32	<i>Hypnea flexicaulis</i> Y. Yamagishi & M. Masuda, 2000		-		-	-
33	<i>Hypnea musciformis</i> (Wulfen) J.V. Lamouroux, 1813					
34	<i>Hypnea pannosa</i> J. Agardh, 1847		-	-	-	-
35	<i>Hypnea valentiae</i> (Turner) Montagne, 1841					
36	<i>Jania rubens</i> (Linnaeus) J.V. Lamouroux, 1816		-	-	-	-
37	<i>Kappaphycus alvarezii</i> (Doty) Doty ex P.C. Silva, 1996		-	-	-	-
38	<i>Laurencia pinnata</i> Yamada, 1931		-	-	-	-
39	<i>Liagora albicans</i> J.V. Lamouroux, 1816	-	-	-	-	-
40	<i>Liagora ceranoides</i> J.V. Lamouroux, 1816		-	-	-	-
41	<i>Liagora donaldiana</i> I.A. Abbott & Huisman, 2003		-	-	-	-
42	<i>Liagora hawaiiiana</i> Butters, 1911		-	-	-	-
43	<i>Liagora perennis</i> I.A. Abbott, 1995		-	-	-	-
44	<i>Liagora tetrasporifera</i> Børgesen, 1927		-	-	-	-
45	<i>Liagora valida</i> Harvey, 1853		-	-	-	-
46	<i>Liagora viscida</i> (Forsskål) C. Agardh, 1822				-	-
47	<i>Lithophyllum kotschyianum</i> Unger, 1858				-	-
48	<i>Lithophyllum okamuræ</i> Foslie, 1900				-	-
49	<i>Lithothamnion glaciale</i> Kjellman, 1883				-	-
50	<i>Nemalion helminthoides</i> (Vellay) Batters, 1902	-	-	-	-	-
51	<i>Palmaria palmata</i> (Linnaeus) F. Weber & D. Mohr, 1805				-	-
52	<i>Peyssonnelia polymorpha</i> (Zanardini) F. Schmitz, 1841				-	-
53	<i>Peyssonnelia squamaria</i> (S.G. Gmelin) Decaisne ex J. Agardh, 1842				-	-
54	<i>Porphyra indica</i> V. Krishnamurthy & M. Baluswami, 1824				-	-
55	<i>Porphyra vietnamensis</i> Tak. Tanaka & Pham-Hoàng Ho, 1962				-	-
56	<i>Scinaia complanata</i> (Collins) A.D. Cotton, 1907				-	-
57	<i>Solieria robusta</i> (Greville) Kylin, 1932				-	-
58	<i>Spermothamnion repens</i> (Dillwyn) Magnus, 1932				-	-
59	<i>Titanophycus validus</i> (Harvey) Huisman, G.W. Saunders & A.R. Sherwood, 2006				-	-
60	<i>Tolyptocladia glomerulata</i> (C. Agardh) F. Schmitz, 1897				-	-
61	<i>Tricleocarpa cylindrica</i> (J. Ellis & Solander) Huisman & Borowitzka, 1990				-	-
62	<i>Tricleocarpa fragilis</i> (Linnaeus) Huisman & R.A. Townsend, 1993				-	-

Geographical and vertical distribution and growth of seaweed are governed by various factors like water temperature, salinity, pH, dissolved oxygen, water transparency, nutrients etc. Specific water quality parameters are required for the growth and propagation of seaweeds. Required environmental factors for spore settlement and growth of seaweed remain in October to April that might be the cause of seaweed availability in the coastal area of Bangladesh and that's why seaweeds can only be found in those months of the year where water quality is favorable (Tables 5, 6 & 7). As the water quality parameters remain in the peak in respect of favorable conditions of seaweeds, the highest abundance of seaweeds found from January to March. Similar finding was also reported in Asian countries by FAO/NACA. The diversity of marine algae in the southeast coast showed that the members of Rhodophyta were dominant followed by Phaeophyta and Chlorophyta.

Table 5. Monthly distribution pattern of green seaweeds (Chlorophyta)

Sl. No.	Name of Seaweeds	Months (2015-2018)						
		Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	<i>Caulerpa macrophysa</i> (Sonder ex Kützing) G. Murray, 1887	-	-	-	+	+	+	-
2	<i>Caulerpa mexicana</i> Sonder ex Kützing, 1849	-	-	-	-	+	+	
3	<i>Caulerpa peltata</i> J.V. Lamouroux, 1809	-	-	-	-	+	+	-
4	<i>Caulerpa racemosa</i> (Forsskål) J. Agardh, 1873	-	-	-	+	+	+	+
5	<i>Caulerpa sertularioides</i> (S.G. Gmelin) M. Howe, 1905	-	-	-	-	+	+	+
6	<i>Caulerpa taxifolia</i> (M. Vahl) C. Agardh, 1817	-	-	-	-	+	+	+
7	<i>Chaetomorpha aerea</i> (Dillwyn) Kützing, 1849	+	+	+	+	+	+	+
8	<i>Cladophora herpestica</i> (Montagne) Kützing, 1849	-	-	+	+	+	+	-
9	<i>Cladophora l aetevirens</i> (Dillwyn) Kützing, 1843	-	-	-	+	+	+	-
10	<i>Codium fragile</i> (Suringar) Hariot, 1889	-	-	-	-	+	+	
11	<i>Enteromorpha compressa</i> (Linnaeus) Nees, 1753	+	+	+	+	+	+	+
12	<i>Enteromorpha intestinalis</i> (Linnaeus) Nees, 1753	-	-	+	+	+	+	+
13	<i>Enteromorpha torta</i> (Mertens) Reinbold, 1893	-	-	+	+	+	+	-
14	<i>Halimeda discoidea</i> Decaisne, 1842	-	-	+	+	+	-	-
15	<i>Halimeda gracilis</i> Harvey ex J. Agardh, 1887	-	-	-	-	+	+	-
16	<i>Halimeda minima</i> (W.R. Taylor) Hillis-Colinvaux, 1968	-	-	-	+	+	-	-
17	<i>Halimeda opuntia</i> (Linnaeus) J.V. Lamouroux, 1816	-	-	-	+	+	-	-
18	<i>Halimeda tuna</i> (J. Ellis & Solander) J.V. Lamouroux, 1816	-	-	-	+	+	+	-
19	<i>Ulva compressa</i> Linnaeus, 1753	-	+	+	+	+	+	+
20	<i>Ulva conglobata</i> Kjellman, 1897	-	-	-	+	+	+	-
21	<i>Ulva fasciata</i> Delile, 1813	-	-	-	+	+	+	-
22	<i>Ulva lactuca</i> Linnaeus, 1753	-	-	-	+	+	+	-
23	<i>Ulva reticulata</i> Forsskål, 1775	-	-	+	+	+	+	-
24	<i>Valoniopsis pachynema</i> (G. Martens) Borgesen, 1934	-	-	-	+	+	+	-

+ Present - Absent



Table 6. Monthly distribution pattern of brown seaweeds (Phaeophyta)

Sl. No.	Name of Seaweeds	Months (2015-2018)						
		Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	<i>Colpomenia peregrina</i> Sauvageau, 1927	-	+	+	+	+	-	-
2	<i>Colpomenia ramosa</i> W.R. Taylor, 1945	-	-	+	+	+	-	-
3	<i>Colpomenia sinuosa</i> (Mertens ex Roth) Derbès & Solier, 1851	-	+	+	+	+	-	-
4	<i>Dictyota atomaria</i> (Woodward) Greville, 1830	-	-	-	-	+	+	-
5	<i>Dictyota ciliolata</i> Sonder ex Kützing, 1859	-	-	-	-	+	+	+
6	<i>Dictyota dichotoma</i> (Hudson) J.V. Lamouroux, 1809	-	-	+	+	+	-	-
7	<i>Dictyota flabellata</i> (Collins) Setchell & N.L. Gardner, 1924	-	-	-	-	+	+	-
8	<i>Dictyota menstrualis</i> (Hoyt) Schnetter, Hörning & Weber-Peukert, 1987	-	-	-	+	+	+	-
9	<i>Dictyota patens</i> J. Agardh, 1882	-	-	-	-	+	+	-
10	<i>Ectocarpus siliculosus</i> (Dillwyn) Lyngbye, 1819	-	-	-	+	+	+	-
11	<i>Hydroclathrus clathratus</i> (C. Agardh) M. Howe, 1920	-	-	+	+	+	-	-
12	<i>Hydroclathrus tenuis</i> C.K. Tseng & Lu Baroen, 1983	-	-	+	+	+	-	-
13	<i>Padina antillarum</i> (Kützing) Piccone, 1886	-	-	-	+	+	+	-
14	<i>Padina australis</i> Hauck, 1887	-	-	-	+	+	+	-
15	<i>Padina boryana</i> Thivy, 1966	-	-	-	+	+	+	-
16	<i>Padina fraseri</i> (Greville) Greville, 1830	-	-	-	+	+	+	+
17	<i>Padina gymnospora</i> (Kützing) Sonder, 1871	-	-	-	+	+	+	-
18	<i>Padina pavonica</i> (Linnaeus) Thivy, 1960	-	-	-	+	+	+	-
19	<i>Padina tetrastrumatica</i> Hauck, 1887	-	-	-	+	+	+	+
20	<i>Ralfsia fungiformis</i> (Gunnerus) Setchell & N.L. Gardner, 1924	-	-	-	+	+	+	+
21	<i>Rosenvingea intricata</i> (J. Agardh) Børgesen, 1914	-	-	-	+	+	+	-
22	<i>Rosenvingea orientalis</i> (J. Agardh) Børgesen, 1914	-	-	-	+	+	+	-
23	<i>Rosenvingea sanctae-crucis</i> Børgesen, 1914	-	-	-	-	+	+	-
24	<i>Sargassum arnautianum</i> Montagne, 1850	-	-	-	+	+	+	-
25	<i>Sargassum filipendula</i> C. Agardh, 1824	-	-	-	-	+	+	-
26	<i>Sargassum ilicifolium</i> (Turner) C. Agardh, 1820	-	-	-	-	+	+	-
27	<i>Sargassum myriocystum</i> J. Agardh, 1848	-	-	-	-	+	+	+
28	<i>Sargassum oligocystum</i> Montagne, 1845	-	-	-	+	+	+	+
29	<i>Sargassum platycarpum</i> Montagne, 1842	-	-	-	-	+	+	-
30	<i>Spatoglossum asperum</i> J. Agardh, 1894	-	-	+	+	+	+	-
31	<i>Stypopodium zonale</i> (J.V. Lamouroux) Papenfuss, 1940	-	-	-	-	+	+	+

+ Present - Absent

Table 7. Monthly distribution pattern of red seaweeds (Rhodophyta)

Sl. No.	Name of Seaweeds	Months (2015-2018)						
		Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	<i>Acanthophora spicifera</i> (M. Vahl) Børgesen, 1910	-	-	+	+	+	-	-
2	<i>Actinotrichia fragilis</i> (Forsskål) Børgesen, 1932	-	-	-	+	+	-	-
3	<i>Amphiroa cryptarthrodia</i> Zanardini, 1843	-	-	-	-	+	+	+
4	<i>Amphiroa fragilissima</i> (Linnaeus) J.V. Lamouroux, 1816	-	-	+	+	+	-	-
5	<i>Amphiroa rigida</i> J.V. Lamouroux, 1816	-	-	-	+	+	+	-
6	<i>Asparagopsis taxiformis</i> (Delile) Trevisan, 1845	-	-	+	+	+	+	-
7	<i>Bangia fuscopurpurea</i> (Dillwyn) Lyngbye, 1819	-	+	+	+	+	+	
8	<i>Champia parvula</i> (C. Agardh) Harvey, 1853	-	-	-	+	+	-	-
9	<i>Chondrus crispus</i> Stackhouse, 1797	-	-	-	-	+	+	-
10	<i>Chrysmenia</i> sp., 1842	-	-	-	+	+	+	-
11	<i>Dermonema pulvinatum</i> (Grunow) Fan, 1962	-	-	-	-	+	+	-
12	<i>Dichotomaria obtusata</i> (J. Ellis & Solander) Lamarck, 1816	-	-	-	-	+	+	-
13	<i>Dudresnaya verticillata</i> (Withering) Le Jolis, 1863	-	-	-	+	+	+	-
14	<i>Eucheuma cottonii</i> Weber-van Bosse, 1913	-	-	-	+	+	+	
15	<i>Eucheuma spinosum</i> J. Agardh, nom. illeg, 1852	-	-	-	+	+	+	-
16	<i>Galaxaura oblongata</i> (J. Ellis & Solander) J.V. Lamouroux, 1816	-	-	-	-	+	+	+
17	<i>Galaxaura rugosa</i> (J. Ellis & Solander) J.V. Lamouroux, 1816	-	-	-	-	+	+	+
18	<i>Ganonema pinnatum</i> (Harvey) Huisman, 2002	-	-	-	-	+	+	-
19	<i>Gelidium pusillum</i> (Stackhouse) Le Jolis, 1863	-	-	+	+	+	+	-
20	<i>Gracilaria corticata</i> (J. Agardh) J. Agardh, 1852	-	-	-	+	+	+	-
21	<i>Gracilaria tikvahiae</i> McLachlan, 1979	-	-	-	+	+	-	-
22	<i>Gracilaria verrucosa</i> (Hudson) Papenfuss, nom. rejic, 1950	-	-	-	-	+	+	-
23	<i>Grateloupia lanceolata</i> (Okamura) S. Kawaguchi, 1997	-	-	-	+	+	+	-
24	<i>Grateloupia livida</i> (Harvey) Yamada, 1931	-	-	-	+	+	+	-
25	<i>Halymenia dilatata</i> Zanardini, 1851	-	-	-	-	+	+	-
26	<i>Halymenia venusta</i> Børgesen, 1932	-	-	-	-	+	+	-
27	<i>Helminthocladia australis</i> Harvey, 1863	-	-	-	+	+	+	-
28	<i>Hildenbrandia rubra</i> (Sommerfelt) Meneghini, 1841	-	-	-	+	+	+	+
29	<i>Hydrolithon onkodes</i> (Heydrich) Penrose & Woelkerling, 1992	-	-	+	+	+	+	-
30	<i>Hypnea cornuta</i> (Kützing) J. Agardh, 1851	-	-	+	+	+	+	-
31	<i>Hypnea esperi</i> Bory, nom. illeg, 1828	-	-	-	+	+	+	+
32	<i>Hypnea flexicaulis</i> Y. Yamagishi & M. Masuda, 2000	-	-	+	+	+	+	-
33	<i>Hypnea musciformis</i> (Wulfen) J.V. Lamouroux, 1813	+	+	+	+	+	+	+
34	<i>Hypnea pannosa</i> J. Agardh, 1847	-	-	-	+	+	+	+

35	<i>Hypnea valentiae</i> (Turner) Montagne, 1841	-	-	-	+	+	+	-
36	<i>Jania rubens</i> (Linnaeus) J.V. Lamouroux, 1816	-	-	+	+	+	-	-
37	<i>Kappaphycus alvarezii</i> (Doty) Doty ex P.C. Silva, 1996	-	-	-	+	+	+	-
38	<i>Laurencia pinnata</i> Yamada, 1931	-	-	-	-	+	+	+
39	<i>Liagora albicans</i> J.V. Lamouroux, 1816	-	-	-	-	+	+	-
40	<i>Liagora ceranoides</i> J.V. Lamouroux, 1816	-	-	-	+	+	-	-
41	<i>Liagora donaldiana</i> I.A. Abbott & Huisman, 2003	-	-	-	-	+	+	+
42	<i>Liagora hawaiiiana</i> Butters, 1911	-	-	-	+	+	+	-
43	<i>Liagora perennis</i> I.A. Abbott, 1995	-	-	-	-	+	+	-
44	<i>Liagora tetrasporifera</i> Børgesen, 1927	-	-	-	-	+	+	-
45	<i>Liagora valida</i> Harvey, 1853	-	-	-	-	+	+	-
46	<i>Liagora viscida</i> (Forsskål) C. Agardh, 1822	-	-	-	-	+	+	+
47	<i>Lithophyllum kotschyannum</i> Unger, 1858	-	-	-	+	+	+	+
48	<i>Lithophyllum okamuræ</i> Foslie, 1900	-	-	-	-	+	+	+
49	<i>Lithothamnion glaciale</i> Kjellman, 1883	-	-	-	+	+	+	+
50	<i>Nemalion helminthoides</i> (Volley) Batters, 1902	-	-	-	-	+	+	-
51	<i>Palmaria palmata</i> (Linnaeus) F. Weber & D. Mohr, 1805	-	-	-	-	+	+	+
52	<i>Peyssonnelia polymorpha</i> (Zanardini) F. Schmitz, 1841	-	-	-	+	+	+	+
53	<i>Peyssonnelia squamaria</i> (S.G. Gmelin) Decaisne ex J. Agardh, 1842	-	-	-	+	+	+	+
54	<i>Porphyra indica</i> V. Krishnamurthy & M. Baluswami, 1824	-	-	-	+	+	+	-
55	<i>Porphyra vietnamensis</i> Tak. Tanaka & Pham-Hoàng Ho, 1962	-	-	-	-	+	+	+
56	<i>Scinaia complanata</i> (Collins) A.D. Cotton, 1907	-	-	-	-	+	+	+
57	<i>Solieria robusta</i> (Greville) Kylin, 1932	-	-	-	-	+	+	+
58	<i>Spermothamnion repens</i> (Dillwyn) Magnus, 1932	-	-	-	+	+	+	-
59	<i>Titanophycus validus</i> (Harvey) Huisman, G.W. Saunders & A.R. Sherwood, 2006	-	-	-	+	+	+	-
60	<i>Tolypocladia glomerulata</i> (C. Agardh) F. Schmitz, 1897	-	-	-	+	+	+	+
61	<i>Tricleocarpa cylindrica</i> (J. Ellis & Solander) Huisman & Borowitzka, 1990	-	-	-	+	+	+	-
62	<i>Tricleocarpa fragilis</i> (Linnaeus) Huisman & R.A. Townsend, 1993	-	-	-	+	+	+	-

+ Present - Absent

The species with the richest diversity found in this study was red seaweeds, which are the majority of seaweeds worldwide. More than 4,000 species are described and are known to have greater diversity in the tropics than in the temperate regions. Thus, we are likely to find the greater diversity of red seaweeds at the study sites than other groups of seaweeds (Tables 8, 9 & 10)

Table 8. Diversity of green seaweeds/Chlorophyta

Sl. No.	Name of Seaweeds	Order	Family	Type of species
1	<i>Caulerpa macrophysa</i> (Sonder ex Kützing) G. Murray, 1887	Bryopsidales	Caulerpaceae	Lectotype
2	<i>Caulerpa mexicana</i> Sonder ex Kützing, 1849	Bryopsidales	Caulerpaceae	Lectotype
3	<i>Caulerpa peltata</i> J.V. Lamouroux, 1809	Bryopsidales	Caulerpaceae	Lectotype
4	<i>Caulerpa racemosa</i> (Forsskål) J. Agardh, 1873	Bryopsidales	Caulerpaceae	Lectotype
5	<i>Caulerpa sertularioides</i> (S.G. Gmelin) M. Howe, 1905	Bryopsidales	Caulerpaceae	Lectotype
6	<i>Caulerpa taxifolia</i> (M. Vahl) C. Agardh, 1817	Bryopsidales	Caulerpaceae	Lectotype
7	<i>Chaetomorpha aerea</i> (Dillwyn) Kützing, 1849	Cladophorales	Cladophoraceae	Lectotype
8	<i>Cladophora herpestica</i> (Montagne) Kützing, 1849	Cladophorales	Cladophoraceae	Lectotype
9	<i>Cladophora laetevirens</i> (Dillwyn) Kützing, 1843	Cladophorales	Cladophoraceae	Lectotype
10	<i>Codium fragile</i> (Suringar) Hariot, 1889	Bryopsidales	Codiaceae	Lectotype
11	<i>Enteromorpha compressa</i> (Linnaeus) Nees, 1753	Ulvaes	Ulvaceae	Holotype
12	<i>Enteromorpha intestinalis</i> (Linnaeus) Nees, 1753	Ulvaes	Ulvaceae	Holotype
13	<i>Enteromorpha torta</i> (Mertens) Reinbold, 1893	Ulvaes	Ulvaceae	Holotype
14	<i>Halimeda discoidea</i> Decaisne, 1842	Bryopsidales	Halimedaceae	Holotype
15	<i>Halimeda gracilis</i> Harvey ex J. Agardh, 1887	Bryopsidales	Halimedaceae	Holotype
16	<i>Halimeda minima</i> (W.R. Taylor) Hillis-Colinvaux, 1968	Bryopsidales	Halimedaceae	Holotype
17	<i>Halimeda opuntia</i> (Linnaeus) J.V. Lamouroux, 1816	Bryopsidales	Halimedaceae	Holotype
18	<i>Halimeda tuna</i> (J. Ellis & Solander) J.V. Lamouroux, 1816	Bryopsidales	Halimedaceae	Holotype
19	<i>Ulva compressa</i> Linnaeus, 1753	Ulvaes	Ulvaceae	Holotype
20	<i>Ulva conglobata</i> Kjellman, 1897	Ulvaes	Ulvaceae	Holotype
21	<i>Ulva fasciata</i> Delile, 1813	Ulvaes	Ulvaceae	Holotype
22	<i>Ulva lactuca</i> Linnaeus, 1753	Ulvaes	Ulvaceae	Holotype
23	<i>Ulva reticulata</i> Forsskål, 1775	Ulvaes	Ulvaceae	Holotype
24	<i>Valoniopsis pachynema</i> (G. Martens) Børgesen, 1934	Cladophorales	Valoniaceae	Holotype



Table 9. Diversity of brown seaweeds/Phaeophyta

Sl. No.	Name of Seaweeds	Order	Family	Type of species
1	<i>Colpomenia peregrina</i> Sauvageau, 1927	Ectocarpales	Scytosiphonaceae	Holotype
2	<i>Colpomenia ramosa</i> W.R. Taylor, 1945	Ectocarpales	Scytosiphonaceae	Holotype
3	<i>Colpomenia sinuosa</i> (Mertens ex Roth) Derbès & Solier, 1851	Scytosiphonales	Scytosiphonaceae	Holotype
4	<i>Dictyota atomaria</i> (Woodward) Greville, 1830	Dictyotales	Dictyotaceae	Holotype
5	<i>Dictyota ciliolata</i> Sonder ex Kützing, 1859	Dictyotales	Dictyotaceae	Holotype
6	<i>Dictyota dichotoma</i> (Hudson) J.V. Lamouroux, 1809	Dictyotales	Dictyotaceae	Holotype
7	<i>Dictyota flabellata</i> (Collins) Setchell & N.L. Gardner, 1924	Dictyotales	Dictyotaceae	Holotype
8	<i>Dictyota menstrualis</i> (Hoyt) Schnetter, Hörning & Weber-Peukert, 1987	Dictyotales	Dictyotaceae	Holotype
9	<i>Dictyota patens</i> J. Agardh, 1882	Dictyotales	Dictyotaceae	Holotype
10	<i>Ectocarpus siliculosus</i> (Dillwyn) Lyngbye, 1819	Ectocarpales	Ectocarpaceae	Holotype
11	<i>Hydroclathrus clathratus</i> (C. Agardh) M. Howe, 1920	Ectocarpales	Scytosiphonaceae	Holotype
12	<i>Hydroclathrus tenuis</i> C.K. Tseng & Lu Baroen, 1983	Ectocarpales	Scytosiphonaceae	Holotype
13	<i>Padina antillarum</i> (Kützing) Piccone, 1886	Dictyotales	Dictyotaceae	Holotype
14	<i>Padina australis</i> Hauck, 1887	Dictyotales	Dictyotaceae	Holotype
15	<i>Padina boryana</i> Thivy, 1966	Dictyotales	Dictyotaceae	Holotype
16	<i>Padina fraseri</i> (Greville) Greville, 1830	Dictyotales	Dictyotaceae	Holotype
17	<i>Padina gymnospora</i> (Kützing) Sonder, 1871	Dictyotales	Dictyotaceae	Holotype
18	<i>Padina pavonica</i> (Linnaeus) Thivy, 1960	Dictyotales	Dictyotaceae	Holotype
19	<i>Padina tetrastromatica</i> Hauck, 1887	Dictyotales	Dictyotaceae	Holotype
20	<i>Ralfsia fungiformis</i> (Gunnerus) Setchell & N.L. Gardner, 1924	Ralfsiales	Ralfsiaceae	Holotype
21	<i>Rosenvingea intricata</i> (J. Agardh) Børgesen, 1914	Ectocarpales	Scytosiphonaceae	Lectotype
22	<i>Rosenvingea orientalis</i> (J. Agardh) Børgesen, 1914	Ectocarpales	Scytosiphonaceae	Lectotype
23	<i>Rosenvingea sanctae-crucis</i> Børgesen, 1914	Ectocarpales	Scytosiphonaceae	Lectotype
24	<i>Sargassum arnaudianum</i> Montagne, 1850	Fucales	Sargassaceae	Holotype
25	<i>Sargassum filipendula</i> C. Agardh, 1824	Fucales	Sargassaceae	Holotype
26	<i>Sargassum ilicifolium</i> (Turner) C. Agardh, 1820	Fucales	Sargassaceae	Holotype
27	<i>Sargassum myriocystum</i> J. Agardh, 1848	Fucales	Sargassaceae	Holotype
28	<i>Sargassum oligocystum</i> Montagne, 1845	Fucales	Sargassaceae	Holotype
29	<i>Sargassum platycarpum</i> Montagne, 1842	Fucales	Sargassaceae	Holotype
30	<i>Spatoglossum asperum</i> J. Agardh, 1894	Dictyotales	Dictyotaceae	Holotype
31	<i>Stypopodium zonale</i> (J.V. Lamouroux) Papenfuss, 1940	Dictyotales	Dictyotaceae	Lectotype



Table 10. Diversity of red seaweeds/Rhodophyta

Sl. No.	Name of Seaweeds	Order	Family	Type of species
1	<i>Acanthophora spicifera</i> (M. Vahl) Børgesen, 1910	Ceramiales	Rhodomelaceae	Lectotype
2	<i>Actinotrichia fragilis</i> (Forsskål) Børgesen, 1932	Nemaliales	Galaxauraceae	Holotype
3	<i>Amphiroa cryptarthrodia</i> Zanardini, 1843	Corallinales	Corallinaceae	Lectotype
4	<i>Amphiroa fragilissima</i> (Linnaeus) J.V. Lamouroux, 1816	Corallinales	Corallinaceae	Lectotype
5	<i>Amphiroa rigida</i> J.V. Lamouroux, 1816	Corallinales	Corallinaceae	Lectotype
6	<i>Asparagopsis taxiformis</i> (Delile) Trevisan, 1845	Bonnemaisoniales	Bonnemaisoniaceae	Holotype
7	<i>Bangia fuscopurpurea</i> (Dillwyn) Lyngbye, 1819	Bangiales	Bangiaceae	Lectotype
8	<i>Champia parvula</i> (C. Agardh) Harvey, 1853	Rhodymeniales	Champiaceae	Holotype
9	<i>Chondrus crispus</i> Stackhouse, 1797	Gigartinales	Gigartinaeae	Lectotype
10	<i>Chrysmenia</i> sp., 1842	Rhodymeniales	Rhodymeniaceae	Lectotype
11	<i>Dermonema pulvinatum</i> (Grunow) Fan, 1962	Nemaliales	Liagoraceae	Holotype
12	<i>Dichotomaria obtusata</i> (J. Ellis & Solander) Lamarck, 1816	Nemaliales	Galaxauraceae	Lectotype
13	<i>Dudresnaya verticillata</i> (Withering) Le Jolis, 1863	Gigartinales	Dumontiaceae	Lectotype
14	<i>Euclima cottonii</i> Weber-van Bosse, 1913	Gigartinales	Solieriaceae	Lectotype
15	<i>Euclima spinosum</i> J. Agardh, nom. illeg., 1852	Gigartinales	Solieriaceae	Lectotype
16	<i>Galaxaura oblongata</i> (J. Ellis & Solander) J.V. Lamouroux, 1816	Nemaliales	Galaxauraceae	Lectotype
17	<i>Galaxaura rugosa</i> (J. Ellis & Solander) J.V. Lamouroux, 1816	Nemaliales	Galaxauraceae	Lectotype
18	<i>Ganonema pinnatum</i> (Harvey) Huisman, 2002	Nemaliales	Liagoraceae	Holotype
19	<i>Gelidium pusillum</i> (Stackhouse) Le Jolis, 1863	Gelidiales	Gelidiaceae	Holotype
20	<i>Gracilaria corticata</i> (J. Agardh) J. Agardh, 1852	Gracilariaceae	Gracilariaceae	Lectotype
21	<i>Gracilaria tikvahiae</i> McLachlan, 1979	Gracilariaceae	Gracilariaceae	Lectotype
22	<i>Gracilaria verrucosa</i> (Hudson) Papenfuss, nom. rejic., 1950	Gracilariaceae	Gracilariaceae	Lectotype
23	<i>Grateloupia lanceolata</i> (Okamura) S. Kawaguchi, 1997	Halymeniales	Halymeniaceae	Lectotype
24	<i>Grateloupia livida</i> (Harvey) Yamada, 1931	Halymeniales	Halymeniaceae	Lectotype
25	<i>Halymenia dilatata</i> Zanardini, 1851	Halymeniales	Halymeniaceae	Lectotype
26	<i>Halymenia venusta</i> Børgesen, 1932	Halymeniales	Halymeniaceae	Lectotype
27	<i>Helminthocladia australis</i> Harvey, 1863	Nemaliales	Liagoraceae	Holotype
28	<i>Hildenbrandia rubra</i> (Sommerfelt) Meneghini, 1841	Hildenbrandiales	Hildenbrandiaceae	Holotype
29	<i>Hydrolithon onkodes</i>	Corallinales	Corallinaceae	Lectotype

31	<i>Hypnea esperi</i> Bory, nom. illeg., 1828	Gigartinales	Cystocloniaceae	Lectotype
32	<i>Hypnea flexicaulis</i> Y. Yamagishi & M. Masuda, 2000	Gigartinales	Cystocloniaceae	Lectotype
33	<i>Hypnea musciformis</i> (Wulfen) J.V. Lamouroux, 1813	Gigartinales	Cystocloniaceae	Lectotype
34	<i>Hypnea pannosa</i> J. Agardh, 1847	Gigartinales	Cystocloniaceae	Lectotype
35	<i>Hypnea valentiae</i> (Turner) Montagne, 1841	Gigartinales	Cystocloniaceae	Lectotype
36	<i>Jania rubens</i> (Linnaeus) J.V. Lamouroux, 1816	Corallinales	Corallinaceae	Lectotype
37	<i>Kappaphycus alvarezii</i> (Doty) Doty ex P.C. Silva, 1996	Gigartinales	Solieriaceae	Holotype
38	<i>Laurencia pinnata</i> Yamada, 1931	Ceramiales	Rhodomelaceae	Lectotype
39	<i>Liagora albicans</i> J.V. Lamouroux, 1816	Nemaliales	Liagoraceae	Lectotype
40	<i>Liagora ceranoides</i> J.V. Lamouroux., 1816	Nemaliales	Liagoraceae	Lectotype
41	<i>Liagora donaldiana</i> I.A. Abbott & Huisman, 2003	Nemaliales	Liagoraceae	Lectotype
42	<i>Liagora hawaiiiana</i> Butters, 1911	Nemaliales	Liagoraceae	Lectotype
43	<i>Liagora perennis</i> I.A. Abbott, 1995	Nemaliales	Liagoraceae	Lectotype
44	<i>Liagora tetrasporifera</i> Børgesen, 1927	Nemaliales	Liagoraceae	Lectotype
45	<i>Liagora valida</i> Harvey, 1853	Nemaliales	Liagoraceae	Lectotype
46	<i>Liagora viscida</i> (Forskål) C. Agardh, 1822	Nemaliales	Liagoraceae	Lectotype
47	<i>Lithophyllum kotschyianum</i> Unger, 1858	Corallinales	Corallinaceae	Lectotype
48	<i>Lithophyllum okamurae</i> Foslie, 1900	Corallinales	Corallinaceae	Lectotype
49	<i>Lithothamnion glaciale</i> Kjellman, 1883	Corallinales	Lithothamniaceae	Holotype
50	<i>Nemalion helminthoides</i> (Vellay) Batters, 1902	Nemaliales	Nemaliaceae	Holotype
51	<i>Palmaria palmata</i> (Linnaeus) F. Weber & D. Mohr, 1805	Palmariales	Palmaraceae	Lectotype
52	<i>Peyssonnelia polymorpha</i> (Zanardini) F. Schmitz, 1841	Peyssonneliales	Peyssonneliaceae	Lectotype
53	<i>Peyssonnelia squamaria</i> (S.G. Gmelin) Decaisne ex J. Agardh, 1842	Peyssonneliales	Peyssonneliaceae	Lectotype
54	<i>Porphyra indica</i> V. Krishnamurthy & M. Baluswami, 1824	Bangiales	Bangiaceae	Lectotype
55	<i>Porphyra vietnamensis</i> Tak. Tanaka & Pham-Hoàng Ho, 1962	Bangiales	Bangiaceae	Lectotype
56	<i>Scinaia complanata</i> (Collins) A.D. Cotton, 1907	Nemaliales	Scinaiaceae	Holotype
57	<i>Solieria robusta</i> (Greville) Kylin, 1932	Gigartinales	Solieriaceae	Holotype
58	<i>Spermothamnion repens</i> (Dillwyn) Magnus, 1932	Ceramiales	Wrangeliaceae	Holotype
59	<i>Titanophycus validus</i> (Harvey) Huisman, G.W.Saunders & A.R. Sherwood, 2006	Nemaliales	Liagoraceae	Holotype
60	<i>Tolypocladia glomerulata</i> (C. Agardh) F. Schmitz, 1897	Ceramiales	Rhodomelaceae	Holotype
61	<i>Tricleocarpa cylindrica</i> (J. Ellis & Solander) Huisman & Borowitzka, 1990	Nemaliales	Galaxauraceae	Holotype
62	<i>Tricleocarpa fragilis</i> (Linnaeus) Huisman & R.A. Townsend, 1993	Nemaliales	Galaxauraceae	Holotype

To date, there is no extensive assessment of the diversity and distribution of seaweeds has been done in Bangladesh coast. The checklist information and its occurrence pattern is very important for the further research and conserves their diversity from being depletion. To make the status of marine algae feasible, more comprehensive research on commercially important seaweed and its application have to be conducted.

## CHLOROPHYTA

### 1. *Caulerpa lentillifera* J. Agardh, 1837

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Caulerpaceae
Genus	Caulerpa
Species	lentillifera
Common name	Small seagrape



**Description:** The plants are small and branches erect. The structure is grape like. The grape, through a narrow channel is attached to the stem. These bunches of grapes emerge from a long horizontal stem that creeps over the surface. The plant grows up to about 2 to 5 meters. The diameter of the plant is usually 2 mm, the branches are about 20 mm long.

**Abundance:** They grow in warm, shallow lagoons in coral rubbles and rocks. They also grow in sandy or muddy sea bottoms. These species are best adapted to pond culture.

**Uses & Compounds:** It is largely eaten as raw salads with vinegar. Also used in potato slices. *C. lentillifera* contains high amounts of vitamin A, vitamin C and minerals like magnesium, iodine etc. It is also a rich source of MUFAs and PUFAs.





## 2. *Caulerpa macrophysa* (Sonder ex Kützing) G. Murray, 1887

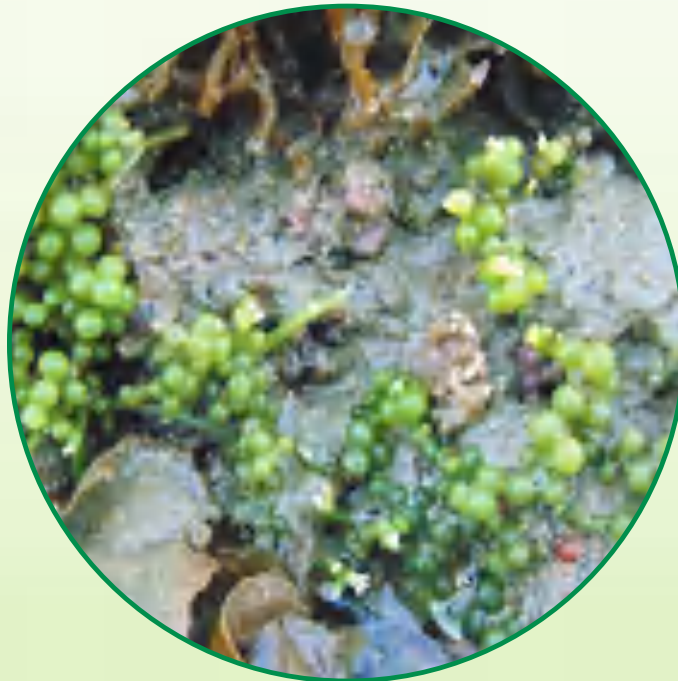
Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Caulerpaceae
Genus	Caulerpa
Species	macrophysa
Common name	Seagrapes



**Description:** The plants grow to be 3-5 cm in height, and have branch lets with spherical tips that are 3-5 mm in diameter. This species is similar to *C. lentillifera* however the branch lets of this seaweed are bigger and without constrictions between the base of the spherical head and the stalks.

**Abundance:** This seaweed forms in clumps on rocks in mid-intertidal to sub tidal zones along shorelines with calm to moderate wave activity and in tidal pools.

**Uses & Compounds:** Use as Antioxidant. Contains proteins, fiber, minerals, vitamins, polyunsaturated fatty acids, and bioactive anti-oxidants.



### 3. *Caulerpa mexicana* Sonder ex Kützing, 1849

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Caulerpaceae
Genus	Caulerpa
Species	mexicana
Common name	Feather algae, Fern algae



**Description:** Generally bright green. Feather like structure. The mid-rib or central stem is flat and usually with a width wider or the same as the length of the side branches. The side branches are short, flat and have rounded to bluntly pointed tips.

**Abundance:** Widespread in most warm seas. On a rock flat overlain by a layer of calcareous sand a few mm thick, and covered, even at low tides, by 20-50 cm of water.

**Uses & Compounds:** Presumed to be edible. The Chinese like to fry it in animal fat, mince it, then eat it. Exhibit in vitro and in vivo anti-inflammatory properties such as the ability to reduce both cell migration to different sites and edema formation induced by chemical irritants.





#### 4. *Caulerpa peltata* J.V. Lamouroux, 1809

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Caulerpaceae
Genus	Caulerpa
Species	peltata
Common name	Big parasol green seaweed



**Description:** Bright yellowish-green to bluish-green color. The plant body is differentiated into stolon, rhizoids and flexible leafy branches. The entire plant body is succulent. The leaves are peltate type. Erect branches up to 5 cm in height.

**Abundance:** Found on shady rocks or dead corals in infralittoral zones along moderately wave-exposed shorelines. *Caulerpa peltata* grows in tide pools, on lower intertidal coral reefs covered with sand or on soft muddy.

**Uses & Compounds:** This seaweed is reported to be edible and used as medicine for its antifungal properties and has ability to lower blood pressure, it is also reported to have larvicidal, antiplasmodial, cytotoxic, immunomodulatory, antioxidant, antimicrobial, and anticoagulant properties. This species was evaluated for producing biodiesel.



### 5. *Caulerpa racemosa* (Forsskal) J. Agardh, 1873

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Caulerpaceae
Genus	Caulerpa
Species	racemosa
Common name	Green grape, Grapeweed, Mouse plant



**Description:** This seaweed resembles bunches of little grapes. *C. racemosa* consists of a number of branches linked to stolons which are anchored to the sandy substrate by rhizoids. Erect branches grow up to 30 cm. Colors range from green to yellowish-green and bluish-green.

**Abundance:** It is found below the low tide mark, rooted in sandy, muddy bottoms or attached to rocks or dead corals. This plants grow throughout the year.

**Uses and Compounds:** Edible green seaweed, used for human consumption and medicine. Having antifungal activity, source of caulerpin- a substance with anesthetic effect; also source of caulerpicin which has a toxic effect. They are rich in fiber, proteins, minerals (calcium and magnesium), folic acid, ascorbic acid, vitamin A, and vitamin B1 while also being low in fat.



6. *Caulerpa sertularioides* (S.G. GMELIN) M. HOWE, 1905

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Caulerpaceae
Genus	Caulerpa
Species	sertularioides
Common name	Green feather algae



**Description:** Branches, feather like, flattened and upright, rising from a creeping stolon, 1-2 mm in diameter, anchored by rhizoids to the substrate. Branches 3-5 cm high. Branchlets oppositely attached to mid-ribs, flattened, slightly curved upwards and tapered at both base and tip. Midrib is slightly flattened, appearing oval in cross-section. Light green to yellow green.

**Abundance:** This delicate plant is usually found in warm, quiet waters in tide pools or sandy, calm reef flats.

**Uses & Compounds:** This seaweed is reported to be edible, to have antibacterial, antifungal, and antitumor properties and to be used to treat high blood pressure and goiter. However some *Caulerpa* species produce toxins to protect themselves from browsing fish.





### 7. *Caulerpa taxifolia* (M. Vahl) C. Agardh, 1817

Taxonomy	□Chlorophyta
Class	□Ulvophyceae
Order	□Bryopsidales
Family	□Caulerpaceae
Genus	□Caulerpa
Species	□taxifolia
Common name	□Caulerpa, □ □Feather algae



Description: The plant body is differentiated into naked stolon, rhizoids and leafy branch. This stolon is not fleshy, it gives off rhizoids towards the substratum and leafy branches are placed opposite to the rhizoids. The leafy branch is feather like and it bears pinna, each pinna is curved upwards. The entire feather like structure gradually narrow towards the tip. Fronds 6-15 cm tall. Dark green to light green.

Abundance: Small patches grow in sandy areas of tide pools and reef flats. In its maximum invasive state, it can cover all favorable available substrates, including rocks, sand and mud.

Uses & Compounds:: *C. taxifolia* can be eaten raw in salad, but it is less in demand than *C. racemosa* is frequently cultivated in aquaria for aesthetic purposes. It is also used as a medicine to lower blood pressure. The plant is cited as having antibacterial, antifungal, ant tubercular and haemagglutinic activities



### 8. *Chaetomorpha aerea* (Dillwyn) Kutzing, 1849

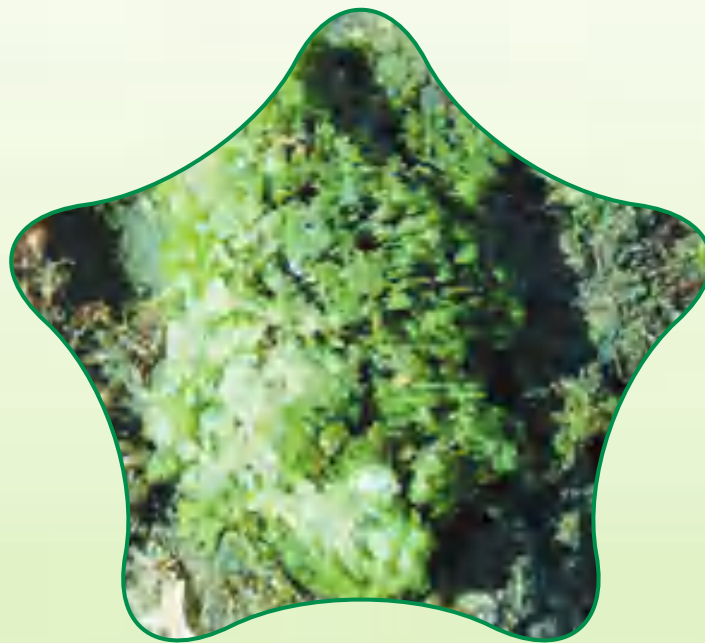
Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Cladophoraceae
Genus	Chaetomorpha
Species	aerea
Common name	Rough green thread algae



**Description:** Plants gregarious, bright free. Attached by a slender, subclavate basal cell which has a disk like base lobed or fimbriation at the margins. Filaments slender towards the base, stiff and straight. Occasionally to 30 cm tall. Green color from chlorophyll a & b.

**Abundance:** Usually growing in the lower parts of the intertidal or shallow in moderately rough water, often where sand accumulates, occasionally on seagrass.

**Uses & Compounds:** Human food, animal feed and agriculture. Source of lectin, a specific protein important for regulation of immune system. Potential use as a source of antibacterial compounds.





### 9. *Cladophora herpestica* (Montagne) Kutzing, 1849

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Cladophorales
Family	Cladophoraceae
Genus	Cladophora
Species	herpestica
Common name	Not known



**Description:** Thallus loose, coarse, as filamentous mats or in mixed turfs. Branching irregular below, unilateral above. Wall formation absent from base of lateral filaments with open connection to parent cell. Rhizoids pale or colorless, fibrous, often terminating in finger-like pads. Up to 200 x 1-2 mm thick.

**Abundance:** Common, forming cushion-like clumps in calm shallow habitat or tangled with other algae; to 5m deep.

**Uses & Compounds:** Used as a biomonitor of heavy metal contamination and bioavailability.



### 10. *Cladophora laetivirens* (Dillwyn) Kützting, 1843

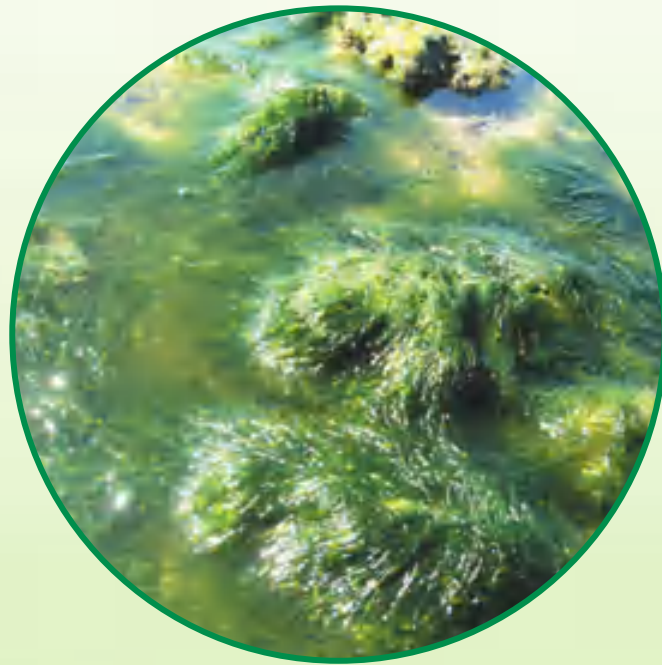
Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Cladophorales
Family	Cladophoraceae
Genus	Cladophora
Species	laetivirens
Common name	Not known



Description: Thallus form dense tufts with pseudodichotomous axes from a small group of rhizoids from cells in the basal region. Epilithic; filaments tapering only slightly, branched from almost every cell above with often somewhat falcate and unilateral branchlets. 2-10 cm high. Light to medium green.

Abundance: Near the line of low tide to 2 m deep, on the hard substrate.

Uses & Compounds: Used as a biomonitor of heavy metal contamination and bioavailability.



## 11. *Codium fragile* (Suringar) P. Hariot, 1889

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Codiaceae
Genus	Codium
Species	fragile
Common name	Dead man's fingers, Green sea fingers, Green sea velvet



**Description:** It is a forked, upright, somewhat velvety, spongy sea plant. Thallus is internally composed of interlocking filaments that end in club-like structures bearing the chloroplasts and the reproductive structures. Internal filaments lack cross-walls. Ranging from 10 to 40 cm high. Dark green alga.

**Abundance:** On rocky shores from the upper intertidal rock pools down to the lower intertidal.

**Uses & Compounds:** *C. fragile* is used for skin care and anti-aging products. It is reported to be regenerating anti-free radical ingredient and have rebalancing and energizing properties. This species also have anti-oxidant, anti-bacterial, anti-inflammatory, immunostimulating, antitumor, antiangiogenic, and antifouling properties.



## 12. *Enteromorpha clathrata* (Roth) C. Agardh, 1811

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvales
Family	Ulvaceae
Genus	Enteromorpha
Species	clathrata
Common name	Stone hair



**Description:** The plant much branched irregularly from the base, of thin threads 1-3 mm wide, cylindrical or slightly flat. Light green in color and is 20-80 mm in height. The thin cylindrical threads are 1-3 mm in width.

**Abundance:** In temperate moderate to calm seas in the intertidal and shallow water.

**Uses & Compounds:** It is used in biochemistry, since it has good protein content. The plant also contains glucose, rhamnose, uronic acids and xylose. Also used as a novel gut micro biota modulator for health promotion and disease management.





### 13. *Enteromorpha compressa* (Linnaeus) Nees, 1820

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvales
Family	Ulvaceae
Genus	Enteromorpha
Species	compressa
Common name	Not known



**Description:** Plants generally gregarious, attached, tubular, more or less compressed or collapsed. Characteristically with several branches from the gradually contracted stalk like base which are similar to the principal blade. Cells in adult plants irregularly placed, rounded sub quadrate. 3 cm tall. Light or bright-green in color.

**Abundance:** It grows on rocks and stones in intertidal regions. It occurs throughout the year.

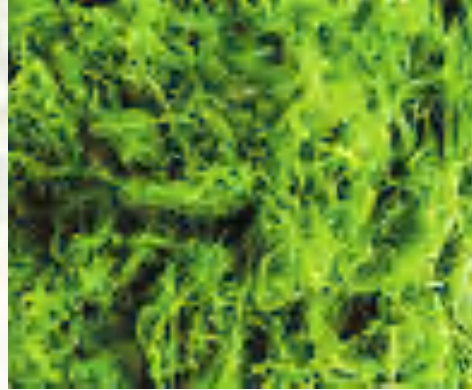
**Uses & Compounds:** It is used as vegetables and also in the form of salad, jam and powder





#### 14. *Enteromorpha intestinalis* (Linnaeus) Nees, 1820

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvales
Family	Ulvaceae
Genus	Enteromorpha
Species	intestinalis
Common name	Stone hair, Link confetti, Hallow-green nori



**Description:** The thallus attached to the rocky substratum. The basal part is tapering and upper part is tubular, several such fronds develop from the base. The plants are light green in color. It may grow up to 1 meter in height, at the speed of 0.15-0.25 cm per day.

**Abundance:** It occurs in a wide range of habitats at all shore levels. Where the substratum is suitable it will grow on rocks, mud, sand. It is abundant in brackish water areas, where there is appreciable fresh water run and in wet areas of the splash zone. It is also a common epiphyte on other algae and shells.

**Uses & Compounds:** The plant is widely used throughout the Asia, for food, feed (especially for fish), as a fertilizer and medicine. It is also applied as fish bait. The dried and crushed fronds can be used as topping for many foods, in soups and as a coating. *E. intestinalis* was rich in Mg, K, Cl, Na, and Ca. The essential amino acids of the species is rich in leucine, valine, and arginine contents.



### 15. *Enteromorpha torta* (Mertens) Reinbold, 1893

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvales
Family	Ulvaceae
Genus	Enteromorpha
Species	torta
Common name	Un Known



**Description:** This plant is morphologically characterized by dichromatic, filiform to strap compressed or tubular thallus. Many branches were found near the base, but lacked proliferations. Cells were longitudinally aligned in the younger part of the branch and were disordered in the older part of the branch. A cap-like parietal chloroplast with one or two pyrenoids was contained in each cell. Thalli 5-10 cm high, 1-8 mm wide. Light green to green in color.

**Abundance:** Epilithic near the intertidal zone. This species is widely distributed throughout the temperate regions and its morphological variation is common, particularly under certain conditions, such as in brackish water and on mud flats in estuaries.

**Uses & Compounds:** Used as vegetables and also in the form of salad, jam and powder.



## 16. *Halimeda discoidea* Decaisne, 1842

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Halimedaceae
Genus	Halimeda
Species	discoidea
Common name	Coralline algae, Money plant



**Description:** Thallus moderately calcified, erect, attached by a distinct holdfast. Axes dichotomously branched, often unbranched for several segments, general in a single plane. Segments subcircular, cuneate or reniform, occasionally elongate. 15 cm tall. Thallus dark green.

**Abundance:** Usually growing on rock, sometimes the rock being partly buried in sand.

**Uses & Compounds:** Used as fertilizers to recondition acidic soils. They are also used as animal feed and reportedly have anti-bacterial and anti-fungal properties.



**16. *Halimeda gracilis* Harvey ex. J. Agardh, 1887**

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Halimedaceae
Genus	Halimeda
Species	gracilis
Common name	Coralline algae, Money plant



Description: Thallus erect or decumbent, arising from a single holdfast. Branching dichotomous or trichotomous, often sparse and with sequences of up to 10 unbranched segments. Segments flattened (rarely sub cylindrical), ribbed, heavily calcified, mostly trilobite, rarely connate. 11 cm tall. Green, drying pale green to white.

Abundance: Epilithic in the sub tidal.

Uses & Compounds: *H. gracilis* is an important sediment-producing green alga. Used as a source of antibiotic production.





## 18. *Halimeda macroloba* Decaisne, 1841

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Halimedaceae
Genus	Halimeda
Species	macroloba
Common name	Coin seaweed



**Description:** The plant is erect with large segments of 2.9x4 cm in a linear series. The segments are suncuneate to reniform and 2.9x4 cm. Thallium erect, bright green in color when fresh and cream or greenish when dried, moderately calcified. Holdfast bulbous. Thallus with a compressed, rectangular to subcuneate basal segment, from which arise in a single plane 2 or more separate segments, altogether forming a somewhat folded, fan-shaped base. Segments of branches distinctly large and flat to compressed, 1 to 3 mm thick, commonly flabellate and occasionally quadrangular, the upper margin entire, undulate or irregularly lobed; largest segment 2.2 cm high and 2.9 cm wide.

**Abundance:** Occurs on sand flats or in shallow water, usually in close association with sea grasses and other large macro algae. They grow attached to a hard substratum or in sand and mud. *H. macroloba* also occurs brackish water.

**Uses & Compounds:** Not utilized commercially, although research have shown that it is a source of growth regulators: auxin, gibberellins, cytokine. Possesses antibacterial and antifungal properties.





### 19. *Halimeda minima* (W.R. Taylor) Hillis-Colinvaux, 1968

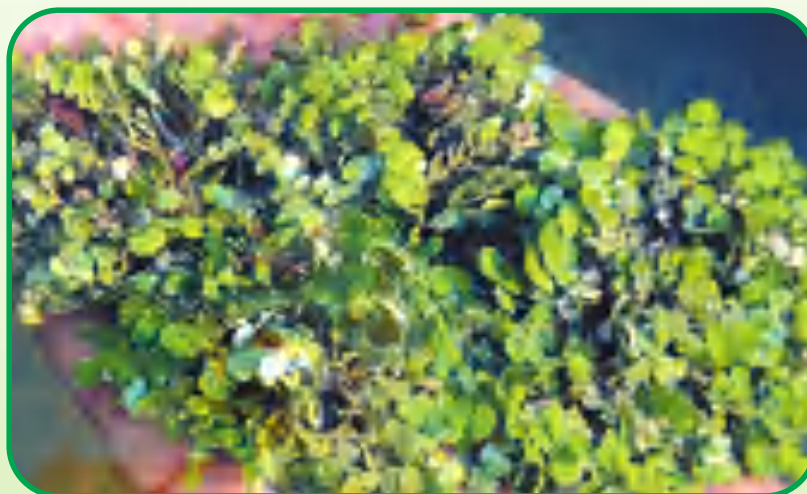
Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Halimedaceae
Genus	Halimeda
Species	minima
Common name	Not known



Description: Thallus arising from a single holdfast, erect or pendant when growing on undercuts, sparingly dichotomously or trichotomously branched, with sequences up to 10 unbranched segments. Segments mostly in one plane, basal segments terete to flattened, occasionally trilobed; others discoid, reniform to trilobed, mostly ribbed, often of a uniform size and shape throughout the thallus. Utricles in 3 or 4 layers; secondary and inner utricles cylindrical and essentially undifferentiated, only slightly constricted if at all. Thallus up to 18 cm tall. Grass-green, drying pale olive-green to white.

Abundance: Epilithic in the intertidal and sub tidal.

Uses & Compounds: *H. minima* is an important sediment-producing green alga. Used as a source of antibiotic production.



**18. *Halimeda opuntia* (Linnaeus) J.V. Lamouroux, 1816**

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Halimedaceae
Genus	Halimeda
Species	opuntia
Common name	Watercress alga



**Description:** Thick, profusely branched clumps of rounded three-lobed or ribbed leaf like segments. The branches are numerous and are in different planes, rather than nearly in a same plane as some other species are. This alga can cover larger areas with a dense mat so that individual plants are indistinguishable. Between 10 to 25 cm in height.

**Abundance:** They grow in shallow depressions, cracks and crevices, between hard corals and other somewhat protected areas of the reef, down to 55 m.

**Uses & Compounds:** Not utilized commercially. Exhibited antibacterial activity.



**20. *Halimeda tuna* (J. Ellis & Solander) J.V. Lamouroux, 1816**

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Bryopsidales
Family	Halimedaceae
Genus	Halimeda
Species	<i>tuna</i>
Common name	Cactus algae, Sea cactus



**Description:** Thallus is erect, rhizoidal holdfast is not well developed and somewhat inconspicuous. Basal portion consists of one or two segments which may be fused, forming a subcuneate or barrel shaped stripe. Branching dichotomous to tetra dichotomous. Segments are overlapping and are either spreading or compact. The distal margin of segments are significantly thicker appearing wavy and folded when pressed. The thallus is erect up to 9 cm tall. Greenish to cream white when dried.

**Abundance:** Found on hard rocky substratum in shallow waters, less than 2 m depth.

**Uses & Compounds:** This species have antibacterial, antioxidant, anticoagulant, pesticide, antifungal, antitrypanosomal, cytotoxic, anti-proliferative activity.





## 21. *Ulva compressa* Linnaeus, 1753

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvaceae
Family	Ulvaceae
Genus	Ulva
Species	compressa
Common name	Green nori Tape weed



**Description:** *U. compressa* is a green seaweed that can have one of two different growth forms. The first is a flat, narrow sheet with ruffled edges, and the second form (often referred to as *E. Compressa*) is a hollow tube of tissue, rounded at the top. In both forms the sheets of tissue are very thin, in fact they are exactly one cell thick. Several blades or tubes arise from a common attachment point. Can grow up to 200 mm long.

**Abundance:** Marine and estuarine habitats, rock pools and sandy rocks, particularly in places with widely varying salinities such as upper shore species.

**Uses & Compounds:** Commonly eaten as sea vegetable, used fresh or dried for both human and animal consumption for its high nutrient levels and good taste; is used dried in cooking, particularly with eggs. This is also utilized as fertilizer to introduce a wide range of minerals to the soil. Many benefits have been associated with *U. compressa* consumption such as cytotoxic, antimicrobial, antiviral and antioxidant properties. Extracts of *U. compressa* are also added to cosmetics products for a soothing quality that reduces skin itchiness and tautness.





## 22. *Ulva conglobata* Kjellman, 1897

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvaceae
Family	Ulvaceae
Genus	Ulva
Species	conglobata
Common name	Not known



**Description:** It is a green algae with rounded edges. Its base is made up of 2 lines of cells. It is 10 cm in length in length.

**Abundance:** *U. conglobata* grew gregariously in intertidal habitats.

**Uses & Compounds:** Its methanol extract is used to treat Alzheimer's disease while its ethanol have polysaccharides which contains 23.04-35.20% of sulfate ester with 10.82-14.91% of uronic acid, and 3.82-451% of protein. It also produces crude enzyme when its mixed with linoleic acid an oleic acid which is widely used to fight influenza.



### 23. *Ulva fasciata* Delile, 1813

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvaceae
Family	Ulvaceae
Genus	Ulva
Species	fasciata
Common name	Sea lettuce



**Description:** Thallus attached to the substratum by the holdfast with rhizoidal outgrowth. The lower part of the thallus is narrow and upper part is expanded and irregularly lobed or wavy. The margin appeared in the form of ruffled. The thallus measures about 1-50 cm in length.

**Abundance:** It is commonly found on intertidal rocks, in tide pools and on coral reef flats. Often abundant in areas of freshwater runoff high in nutrients such as near the mouth of streams and run-off pipes. Common from upper intertidal to 5 m deep, rare in deep water, but a few dredged collections to 100 m deep.

**Uses & Compounds:** *Ulva fasciata* is one of the several species of green algae used extensively in traditional food preparation. It has a very fine texture and lovely fresh taste and is often chopped into salads or used as relish, though it can also be cooked and used in soups. Have antiviral, algicidal, antifungal, larvicidal, cytotoxic, antifouling, antibacterial, antioxidant activity.



## 24. *Ulva lactuca* Linnaeus, 1753

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvaceae
Family	Ulvaceae
Genus	Ulva
Species	lactuca
Common name	Sea lettuce, Green laver



**Description:** The thallus attached to the substratum by the holdfast with rhizoidal outgrowth. Thallus appear in the form of crinkled, expanded foliaceous with undulate margin. Thallus is up to 250 mm long. The color is yellowish, bright green.

**Abundance:** It is found in moderately exposed situations on rocks, wood works and coarse algae, in pools and quiet shallow waters near the low tide mark. It also thrives in brackish water with organic pollution. This species occurs in all months of the year.

**Uses & Compounds:** *U. lactuca* is sold both in fresh and dried form, in flakes, powders and salad mixes. It is a delicate seaweed with a mild flavor. It is used as seasoning by itself and in blends, and can be found in soups and salads. It also a key ingredient in many cosmetic and personal care items such as soap, lotion, toner, lifting cream, eye cream, lip cream, makeup remover, body polish, bath soaks, antiaging products, shaving lotion, shampoo, conditioner and serums. It is also a component in gardening, fertilizers products and also used in animal feeds. This species have antioxidants, antibacterial, anti-tumor, anti-inflammatory, anti-fouling, antifungal, antiviral, anti-algal activity.



## 25. *Ulva reticulata* Forsskal, 1775

Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Ulvaceae
Family	Ulvaceae
Genus	Ulva
Species	reticulata
Common name	Ribbon sea lettuce



**Description:** The plant is attached to a substratum throughout its life by holdfast. The thallus is an expanded sheet, 2 layered in thickness. Plants reticulate or net like or profusely perforated in appearance. Thallus grows up to 62.4 cm to 187.2 cm in length and 10 to 20 cm in width. Plants pale to dark green in color.

**Abundance:** It is attached to rocks or grow intermingled with other seaweeds in the intertidal and subtidal regions. It occurs almost throughout the year.

**Uses & Compounds:** Jam can be prepared from this marine alga. It contains 24.4% proteins, 16.9% carbohydrate, 8.6% lipid. *Ulva reticulata* is also one type of green seaweed which is under-utilized, used mainly as animal feeds.





## 26. *Valoniopsis pachynema* (G. Martens) Borgesen, 1934

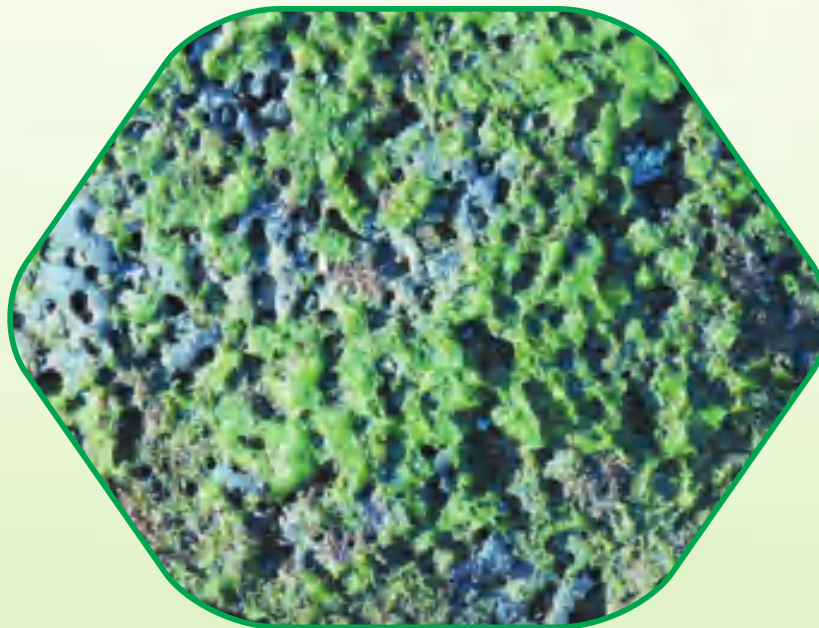
Taxonomy	Chlorophyta
Class	Ulvophyceae
Order	Cladophorales
Family	Valoniaceae
Genus	Valoniopsis
Species	pachynema
Common name	Not known



**Description:** Axes generally erect, usually slightly curved distally and verticillately, umbellately or unilaterally branched. Segments cylindrical, mostly to 12 mm long. Lower segments divided by regular transverse walls. Thallus form densely packed clumps on intertidal rocks, to 8 cm (probably more) in extent. Thallus medium to dark green.

**Abundance:** The Astro-turf algae prefers its habitat in the lower littoral zones (the region of the shore of a lake or sea or ocean) growing luxuriantly on rocky substrate where there is high wave action.

**Uses & Compounds:** Rich in macronutrient, specially Calcium and Sulfur





# PHAEOPHYTA

## 1. *Colpomenia peregrina* Sauvageau, 1927

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ectocarpales
Family	Scytosiphonaceae
Genus	Colpomenia
Species	peregrina
Common name	Sea potato



**Description:** Plants balloon-like when young, becoming contorted and collapsed with age. Frond thin, papery, delicate and filled with sea water when young, hollow and empty when older. Grow up to 250 mm. Brown when young to yellow-brown when older.

**Abundance:** Generally growing epiphytically on *Corallina officinalis* and other algae, and on mussels and oysters. The plant most obvious in spring

**Uses & Compounds:** Used as either as herbarium vouchers or in silica.





## 2. *Colpomenia ramosa* W.R. Taylor, 1945

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ectocarpales
Family	Scytosiphonaceae
Genus	Colpomenia
Species	ramosa
Common name	Bladder



**Description:** The plants are globular, inflated up to 10 cm or more across, at first smooth, later lobed, folded and torn. The walls are thick, more than 5 cell layers, the cavity is initially filled with sea water but becomes hollow and air filled. The plant is broadly attached at the base. The color is golden to greenish brown, the texture is firm.

**Abundance:** Plants are often epiphytic on intertidal algal turf on moderately exposed coasts

**Uses & Compounds:** Used as either as herbarium vouchers or in silica.





### 3. *Colpomenia sinuosa* (Mertens ex Roth) Derbes & Solier, 1851

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ectocarpales
Family	Scytosiphonaceae
Genus	Colpomenia
Species	sinuosa
Common name	Puffy brown seaweed



**Description:** Plants primarily hollow and sub spherical structures. With age they become irregularly expanded and lobed and occur solitary or clustered. Thallus wall is 0.3-0.4 mm thick and consists of 2-3 layers of cells. The inner cells are colorless and large, the cortical layer consists of pigmented cells. Diameter 2-5 cm primarily, may be up to 10 cm. Colors range from beige to yellowish brown.

**Abundance:** Lower intertidal to 15 m deep. Firmly attached to hard surfaces or epiphytic on other organism.

**Uses & Compounds:** Puffy brown seaweed is eaten by people and used as animal feed, medicine for its antibacterial and antitumor properties. Used as a source of alginate and fertilizer







#### 4. *Dictyota atomaria* (Woodward) Greville, 1830

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Dictyota
Species	atomaria
Common name	



**Description:** Frond flat, membranaceous, rib less, reticulated, dichotomous or irregularly cleft. Fructification in wavy transverse lines, with intermediate scattered sporules. Root, a mass of woolly fibers.

**Abundance:** Common in intertidal and shallow sub tidal habitats along rocky coasts.

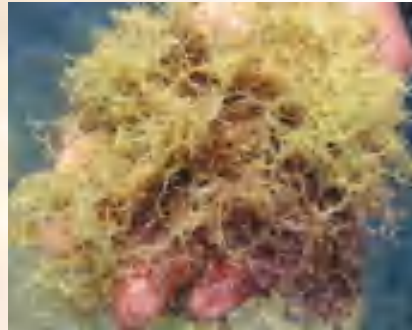
**Uses & Compounds:** Not known





### 5. *Dictyota bartayresiana* J.V. Lamouroux, 1809

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Dictyota
Species	bartayresiana
Common name	

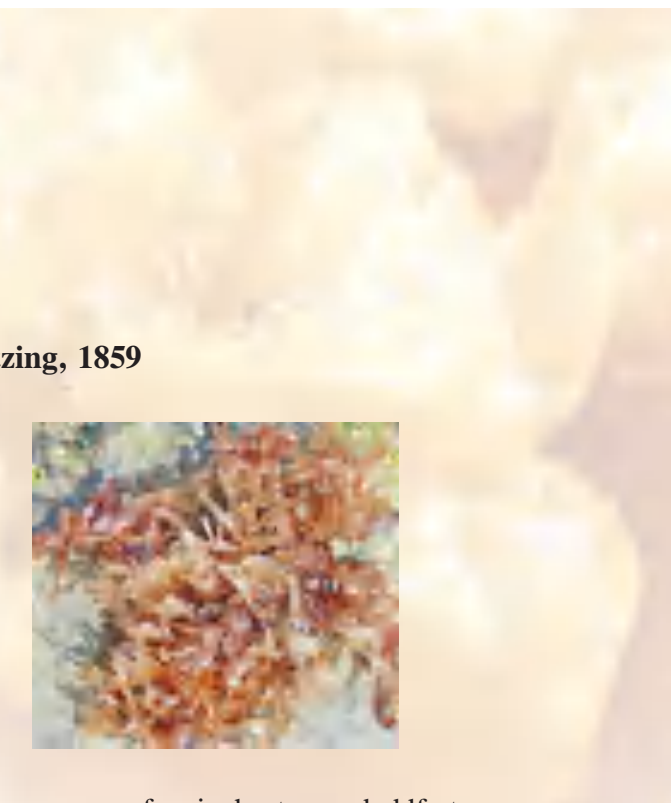


**Description:** The plant grows to a height of 9 to 14 cm, being anchored to the seabed by a variably-shaped holdfast surrounded by rhizoids. The blades are flat and branch dichotomously. The thallus is 6 to 10 mm wide below each junction and 2 to 4 mm wide just above; the sections are 10 to 15 mm long and have no midrib. The margins of the blade are entire and the tips rounded in young fronds and pointed in older ones. The sporangia are 125 to 140  $\mu\text{m}$  in diameter.

**Abundance:** This seaweed is found in the tropical water. It occurs at depths down to about 108 m.

**Uses & Compounds:** Use as animal feed.





## 6. *Dictyota ciliolata* Sonder ex Kutzing, 1859

Taxonomy □	Chlorophyta
Class □	□Phaeophyceae
Order □	□Dictyotales
Family □	□Dictyotaceae
Genus □	□Dictyota
Species □	□ciliolata
Common name	



**Description:** Thalli are erect, attached by a means of a single stupose holdfast. Stolonoidal fibers are absent. Straps, 2-3 mm wide, are slender and dichotomously branched. The margins are dentate, rarely smooth, while surface is always smooth. The apices are round. The medulla and cortex are uniformly one-layered. Upton 8 cm tall. Light brown to yellow green iridescence.

**Abundance:** Attached to rock in sea grass bed, and in intertidal pools in moderately high energy habitats.

**Uses & Compounds:** Extracts have antifungal and antioxidant activity.







## 7. *Dictyota dichotoma* (Hudson) J.V. Lamouroux, 1809

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Dictyota
Species	dichotoma
Common name	Brown fan weed



**Description:** Thallus attached to the substratum with a help of hard holdfast. Plant is dichotomously branched. Tip ends with 'V' shaped structure and it shows acute angle. Plants about 20 cm tall. Yellow-brown to darker-brown in color.

**Abundance:** Pools from mid-tide to below.

**Uses & Compounds:** Used as human food, animal feed, alginate etc







### 8. *Dictyota flabellata* (Collins) Setchell & N.L. Gardner, 1924

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Dictyota
Species	flabellata
Common name	



**Description:** Thallus bushy, erect. Holdfast inconspicuous, fibrous. Branching dichotomous to irregular. Apices initially dichotomously branched. Blades strap-shaped, margins smooth. Medulla one cell thick; cells rectangular, arranged in irregular rows. Surface cells rectangular, arranged in longitudinal rows. 15-26 cm high. Color dark yellow-brown.

**Abundance:** Common on small rocks, coral fragments or at the base of living coral and up to 26 m depth.

**Uses & Compounds:** Used as human food, animal feed, alginate etc.





### 9. *Dictyota implexa* (Desfontaines) J.V. Lamouroux, 1809

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Dictyota
Species	<i>implexa</i>
Common name	Yellow Dictyote



**Description:** It is a brown algae, ranging from 10 to 55 mm in size. It is a thallus with bushy, yellowish-brown dichotomous branches, ribbon-like fronds that are blunt and repeatedly forking at the same length in a regular manner. This species has erect 1-3 mm wide branches that are strap-shaped, strongly twisted, dichotomously branched with a wide angle, and entire margins with slightly aculeate tips.

**Abundance:** The plants grow on rocks, gravel or other seaweeds such as *Sargassum* species in lower intertidal to sub tidal zones along moderately wave exposed shorelines. Found in shallow waters up to 50 m deep on firm substrate. It has the ability to grow intertwined with other algae.

**Uses & Compounds:** Potential biotechnological application as an antithrombotic.





10. *Dictyota menstrualis* (Hoyt) Schnetter, Horning & Weber-Peukert, 1987

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Dictyota
Species	menstrualis
Common name	Littel brown seaweed



Description: Thallus erect. Dichotomously branched blades starpshadep, 2-15 mm wide. Surface cells rectangular to polygonal. Medulary layer of large hyaline cells. 15-25 cm height. Yellow brown to dark brown.

Abundance: Epilithic on rocks and coral, and occurring in sandy areas and sea grass beds.

Uses & Compounds: Potential source of micro-nutrients





## 11. *Ectocarpus siliculosus* (Dillwyn) Lyngbye, 1819

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ectocarpales
Family	Ectocarpaceae
Genus	Ectocarpus
Species	siliculosus
Common name	



**Description:** Axes freely branched, main axis not distinguishable. Filaments up to 30  $\mu\text{m}$  in diameter, tapering toward the apices. Sometimes forming terminal pseudo hairs, forms soft beards on larger plants or other firm substrata and grows up to 60 cm long. Plants tufted, often only one to a few cm tall, but in exceptional cases up to 20 cm.

**Abundance:** On various firm substrata near the low tide mark or below, later often free floating: also epiphytic.

□  
**Uses & Compounds:** Extracts have antibacterial and antioxidant activity.







## 12. *Hydroclathrus clathratus* (C. Agardh) M. Howe, 1920

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ectocarpales
Family	Scytosiphonaceae
Genus	Hydroclathrus
Species	clathratus
Common name	Perforated brown seaweed.



**Description:** Plants clathrate, spongy or netlike, irregularly shaped, thick, often lobed. They are usually broadly attached over most of the lower surface by groups of rhizoids. Often 15-25 cm in diameter. Thallium light brown or yellowish brown.

**Abundance:** Usually in mid- to low intertidal pools and shallow reef flats. Occasionally in intertidal upper pools; rarely to 33 m depth. Often epiphytic, often in multispecies turf, or growing on rocks.

**Uses & Compounds:** *H. clathratus* has been used for centuries in traditional cuisine and medicines of island cultures. It is known to possess anticancer, anti-herpetic, anti-inflammatory and anti-coagulant properties and is now used as a mineral supplement in cosmetics. Extracts have antiviral, antitumor, cytotoxic and antimicrobial activity. Used for human consumption; mixed with other vegetables in salads; contains iodine, mannitol, protein, vitamins, folic and folinic acids; also used for animal feed and fertilizer for its high concentration of micronutrients.





### 13. *Hydroclathrus tenuis* C.K. Tseng & Lu Baroen, 1983

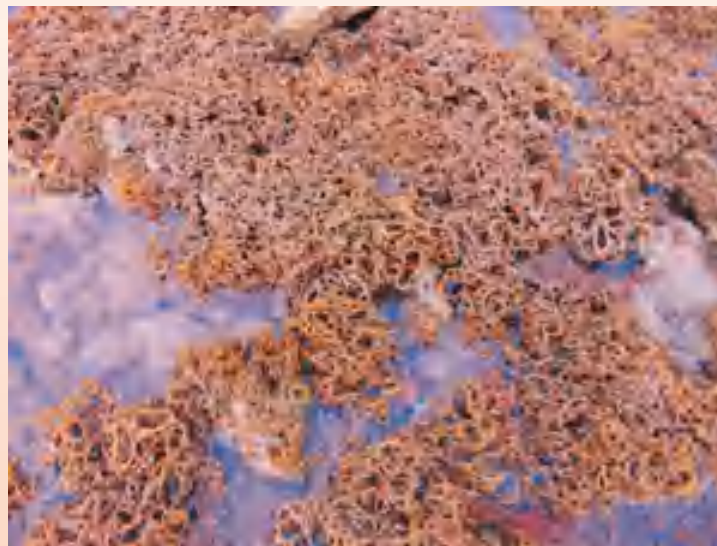
Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ectocarpales
Family	Scytosiphonaceae
Genus	Hydroclathrus
Species	tenuis
Common name	Un Known



**Description:** Thalli attached when young, vesicular, becoming hollow with perforations; mature thalli detached from substrate, developing into large reticulate network with rounded holes; reticulate thalli very thin, about 250-300  $\mu\text{m}$  thick. Network consisting of cortex and medulla; cortex with small, quadrate, pigmented cells, 8-10  $\mu\text{m}$  in diameter; medulla composed of several layers of large, colorless, parenchymatous cells, 70-30  $\mu\text{m}$  in diameter; colorless hairs grouped in shallow depressions on surface of thalli. Yellow-brown in color.

**Abundance:** Widely distributed in most of the tropical warm waters.

**Uses & Compounds:** Used in human food, in salads after blanching in hot water or as a spicy ingredient. They are also applied as fertilizer, animal fodder and insect repellent, and are a good source of alginate and iodine. It also contains iodine, mannitol, as well as growth regulators such as auxin, gibberellins and cytosine.





#### 14. *Padina antillarum* (Kutzing) Piccone, 1886

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Padina
Species	antillarum
Common name	Un Known



**Description:** Blades are divided into few flabellate, lateral lobes, characteristically 4-6 cells thick, except at margins (2 cells thick); base rough, thicker. Calcification of blades usually conspicuous. Concentric hair lines well developed on lower surface of blade, at equal distance; faint lines in between hair lines present, especially at middle to lower portions of thallus. Blades are 5-10 cm tall. Green-brown or yellow-brown.

**Abundance:** The plants grow on rocks, gravel or dead coral in mid intertidal to sub tidal zones along moderately wave exposed shorelines.

**Uses & Compounds:** All *Padina* can be used as fertilizer or as a source of the phycocolloid alginate. *P. antillarum* is occasionally used as human food.







### 15. *Padina australis* Hauck, 1887

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Padina
Species	australis
Common name	Un Known



**Description:** The plants are flat, thin, soft. The cross section of the blade shows that it is 2 cells thick all through the blade. The sours is not covered by indusium. About 15 cm tall. Light brown color, whitish in some portion due to slight calcification.

**Abundance:** The plants grow on rocks, gravel or dead coral in mid intertidal to sub tidal zones along moderately wave exposed shorelines.

**Uses & Compounds:** Used as salad, often used for preparing sweetmeat.







## 16. *Padina boryana* Thivy, 1966

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	<i>Padina</i>
Species	<i>boryana</i>
Common name	Un Known



**Description:** Blades are flabelliform, usually split into several segments, slightly encrusted with chalk on upper surface, composed of 2 layers of rectangular, thin-walled cells. Concentric hair lines on blades conspicuous. Holdfast stipose, covered with brown hairs. Tetrasporangia forming sori, without indusium, in every glabrous zone, regularly arranged just above every hair line on lower blade surface. Blades are 8-10 cm tall. Yellow-brown.

**Abundance:** The plants grow on rocks, gravel or dead coral in mid intertidal to sub tidal zones along moderately wave exposed shorelines.

**Uses & Compounds:** Often used as food





### 17. *Padina fraseri* (Greville) Greville, 1830

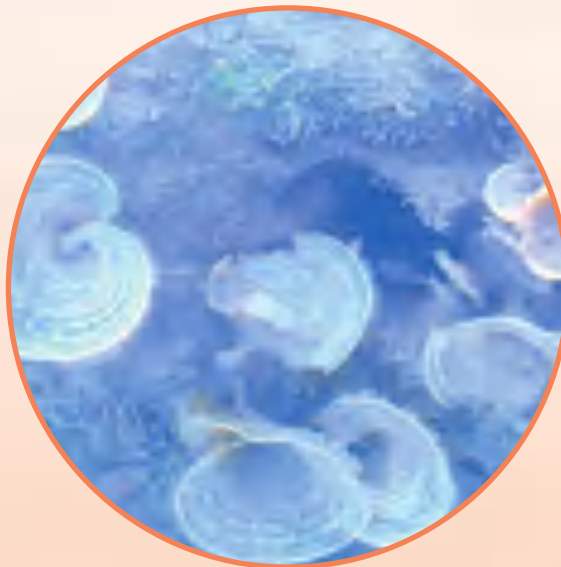
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Padina
Species	fraseri
Common name	Un Known



**Description:** The plants medium to dark brown, fan-shaped blades when young becoming slashed later into wedge-shaped pieces. Thallus in leaf-like clusters, banding if present faint; calcification if present light on lower surface. Blades fan-shaped, 4-12 cm broad, of 3, occasionally 4 layers. Outer margin enrolled. Surface hairs absent or rare, reported in concentric lines on both sides of blades. Rhizoidal base tangled, matted. Fertile bands in concentric zones or separated sori midway between hair bands on upper surface. The plants 4-12 cm tall. Golden to dark brown in color.

**Abundance:** Presence attached to rock, coral fragments or rubble and occur intertidal to 5 m deep.

**Uses & Compounds:** Use as antibiotics





### 18. *Padina gymnospora* (Kutzing) Sonder, 1871

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Padina
Species	<i>gymnospora</i>
Common name	Mermaid fan seaweed



**Description:** Thallus attached to the substratum with the help of a spongy pad like holdfast. The fronds appear in the form of rosette on the substratum, the upper surface is calcified and margin is in-rolled. The terminal rounded blade splits into narrow slit. Lower part of blade bears small stalk like structure.

**Abundance:** On rock and other firm substrata (mangrove-roots), in calm or only moderately wave-exposed locations in the intertidal, found in up to 14 m depth.

**Uses & Compounds:** Provide pharmacological activity i.e. antibiotic. *P. gymnospora* favored wound repair in vitro what could be related to its fatty acid composition.





### 19. *Padina pavonica* (Linnaeus) Thivy, 1960

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Padina
Species	pavonica
Common name	Peacock's tail



**Description:** Young fronds are thin, leafy and flat, with entire margins. Older fronds are thicker, concave, fan-shaped or funnel-shaped, with lobed margins. The outer (under) surface has concentric rows of small, fine hairs and is banded with zones of olive green, pale & dark brown, while the inner (upper) surface is covered with a thin layer of slime. Both sides are thinly calcified and the margins tend to curl inwards. The blades are attached by a holdfast which may be matted. 5-10 cm. Brownish white in color.

**Abundance:** It grows in pools in the littoral zones and in the shallow infralittoral zone. It typically grows where they are sandy, clayey or silty sediments in pools beneath receding mudstone and sandstone cliffs. Other habitats include mangrove roots, rocks, pieces of shell, sea grass meadows and coral reefs on flats in the lower intertidal zone.

**Uses & Compounds:** Extracts of this seaweed have been found to have anticarcinogenic and cytotoxic activity. A benzene extract of the seaweed has been shown to be effective in controlling the red cotton strainer (*Dysdercus cingulatus*), a pest of cotton crops, killing both eggs and nymphs. It is used in pharmacy for osteoporosis.







## 20. *Padina tetrastromatica* Hauck, 1887

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	<i>Padina</i>
Species	<i>tetrastromatica</i>
Common name	Un known



**Description:** The plants are flat, thin and 4 cells thick, soft and slightly leather-like to the touch, and reach about 15-20 cm in height. Blades are divided into numerous flabellate pieces. The color of this seaweed is slightly dark brown. Thallus attached to the substratum with the help of a hard holdfast. Thallus splits longitudinally to form several small lobes called fronds. Dark lines are clearly visible in the form of concentric zones on the blades of the thallus.

**Abundance:** The plants grow on rocks or dead coral in subtidal zones along moderately wave exposed shorelines.

**Uses & Compounds:** Having antibacterial, antimicroalgal, and antimussel foot adherence potentials.





## 21. *Ralfsia fungiformis* (Gunnerus) Setchell & N.L.Gardner, 1924

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ralfsiales
Family	Ralfsiaceae
Genus	Ralfsia
Species	fungiformis
Common name	Un known



**Description:** The thallus resembles a fungus, with broadly overlapping lobes that are free from substrate. Thalli form nearly circular patches 1 mm thick. This slow growing perennial has concentric growth lines visible on the lobes. Thalli are 2-6 cm in diameter. Olive brown to yellowish in color.

**Abundance:** It is found on rock in the mud to low intertidal, including tide pools and prefers a protected to semi-exposed habitats.

**Uses & Compounds:** Not known





## 22. *Rosenvingea intricata* (J.Agardh) Borgesen, 1914

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ectocarpales
Family	Scytosiphonaceae
Genus	Rosenvingea
Species	intricata
Common name	Un known



**Description:** Plants profusely branched, branching wide angled, irregularly dichotomous or pseudo dichotomous, tubular, hollow inside. Other parts of the thallus highly compressed with uneven surface, 10 cm or more at its widest part. Branches decreasing in size, ultimately ending in every minute ramification, hair like, terete. Transverse section of thallus with 3-4 layers of cells, inner most layer of cell lining the hollow cavity larger than the peripheral cells, outermost layer in surface view irregularly polygonal cells, each cell with a single chromatophore. Up to 5 cm broad and tall. Olive or light to dark brown in color.

**Abundance:** Epilithic in the intertidal and shallow sub tidal.

**Uses & Compounds:** Used as a source of alginate and fertilizer.







### 23. *Rosenvingea orientalis* (J.Agardh) Borgesen, 1914

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Ectocarpales
Family	Scytosiphonaceae
Genus	Rosenvingea
Species	orientalis
Common name	Un known



Description: Thallus erect, soft and lax; branching mostly sub dichotomous, divaricated (almost cervicorn). Axes 1-3 mm diam, tubular, with acuminate apices. Structures with the central cavity and frond wall 3-5 cell layers thick, this with an inner layer of large hyaline medullary cells, grading to a cortex of pigmented cells. Outermost layer of the cortex with cells longitudinally aligned, somewhat irregularly shaped. Hairs in small clusters on the frond surface. Upton 15 cm tall. Olive-brown.

Abundance: Grows on rock in the intertidal and shallow sub tidal, usually associated with sand.

Uses & Compounds: Not known.







## 24. *Rosenvingea santae-crucis* Borgesen, 1914

Taxonomy □ Chlorophyta

Class □ □ Phaeophyceae

Order □ □ Ectocarpales

Family □ □ Scytosiphonaceae

Genus □ □ Rosenvingea

Species □ □ santae-crucis

Common name □ Un known



**Description:** Plant is sparsely and irregularly alternate or sub dichotomously branched. Gulf material is thicker in transverse section (cavity to cortex) and 4-5 cell layers. The axes are cylindrical and irregularly branched with a somewhat antler-like appearance at the tips. Colorless hairs present scattered over the thallus surface. 15 cm in height and 2 mm in width. Thalli golden brown in color.

**Abundance:** On rock sub-stratum, mid to low intertidal and protected semi-exposed habitats.

**Uses & Compounds:** Not known





## 25. *Sargassum arnaudianum* Montagne, 1850

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Fucales
Family	Sargassaceae
Genus	Sargassum
Species	arnaudianum
Common name	Un known



**Description:** Long stem attached to the substrate by crampons. The broad leaves have a serrated margin and are dotted with small asperities. Oval-shaped floats (aero cysts) are attached to the stem with padancles. At the end of the growth phase, they come off the bottom and float on the surface carried by the current or fall on the shore. The plants height from 10 to 200 cm. Yellowish-brown to dark brown in color.

**Abundance:** Generally inhabit shallow water and coral reefs.

**Uses & Compounds:** Not know





## 26. *Sargassum filipendula* C. Agardh, 1824

Taxonomy	□ Chlorophyta
Class	□ Phaeophyceae
Order	□ Fucales
Family	□ Sargassaceae
Genus	□ Sargassum
Species	□ filipendula
Common name	□ Un known



**Description:** Its small holdfast produces anew to several cylindrical stipes, which are typically 0.2-0.3 cm in diameter, with numerous narrow blades, up to 6 cm in length. Pneumatocysts (air bladders that float tissues upright into the water column) and reproductive structures are also present. Plant is from 10 to 30 cm long.

**Abundance:** On firm substrata in the shallow sub littoral, to 6 m depth.

**Uses & Compounds:** Extracts have antitumor, antioxidant and antifungal activity.







## 27. *Sargassum ilicifolium* (Turner) C. Agardh, 1820

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Fucales
Family	Sargassaceae
Genus	Sargassum
Species	<i>ilicifolium</i>
Common name	Un known



**Description:** The plant attached to the substratum with the help of holdfast. The leaves are elliptical in the upper part of the plant. The margin bears larger and smaller teeth and midrib is present up to the length  $\frac{3}{4}$  of the leaf. Stalked globular vesicles are present. Plants 30-40 cm high.

**Abundance:** Shallow reef flats and rocky bottom.

**Uses & Compounds:** Used as a source of alginate, fertilizer, medicine and animal feed.







## 28. *Sargassum myriocystum* J. Agardh, 1848

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Fucales
Family	Sargassaceae
Genus	Sargassum
Species	myriocystum
Common name	Agar-agar koepan



**Description:** Basal portion forms thick discoid holdfast. Upper portion richly branched. Axes of the plant rough due to the presence of short processes. Leaves become smaller upwards, margins of the leaves dentate and apex rounded. Plants 20-30 cm in height. Color dark-brown.

**Abundance:** Shallow reef flats and rocky bottom.

**Uses & Compounds:** Used as biofertilizer, animal feed, antioxidant etc.





## 29. *Sargassum oligocystum* Montagne, 1845

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Fucales
Family	Sargassaceae
Genus	Sargassum
Species	oligocystum
Common name	Sargassum weed



**Description:** Holdfast small, discoid. Stem short, about 5 mm long, cylindrical to slightly compressed, finely villose, simple or sometimes branched. Primary branches smooth & strongly flattened, especially at basal portions, 3-4 mm at broadest portion. Base of leaves acute to cuneate, margin irregularly serrate-dentate; apex mainly obtuse to acute, mid rib distinct almost up to apex. Primary branches up to 80 cm in length. Brownish in color.

**Abundance:** Rocky sub-stratum, coral flats, lower intertidal to sub tidal waters.

**Uses & Compound:** Important source of alginate mainly used as emulsifying, stabilizing and gelling agents in food products; contains iodine, protein, vitamin C and minerals used as medicine. Also source of tannins and phenols and used as animal feed and fertilizer.





### 30. *Sargassum platycarpum* Montagne, 1842

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Fucales
Family	Sargassaceae
Genus	<i>Sargassum</i>
Species	<i>platycarpum</i>
Common name	Un Known



**Description:** Plants serrated, gold-brown leaves that form from a series of thick main branches. Air bladders are common on this species and help to keep the plant upright. Have a very sturdy holdfast that is able to securely anchor itself in very turbulent environments. Mature plants often reach to a height of 30 cm' or more in deeper environment.

**Abundance:** Most are found in shallow water.

**Uses & Compound:** Antimicrobial, antioxidant properties







### 31. *Sargassum polycystem* C. Agardh, 1824

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Fucales
Family	Sargassaceae
Genus	Sargassum
Species	polycystem
Common name	Un Known



**Description:** Thalli large, dark brown to yellowish brown, attached to rocks by a coarse branching holdfast, stem short cylindrical. Primary branches terete, bearing irregularly alternate secondary branches with numerous simple and Y-shaped proliferations. Mature thallium with fewer and smaller oblanceolate leaves, 7 to 15 mm long and 1.5 to 4 mm wide, with coarsely dentate or serrated margins; midrib prominent up to near the apex. Thallium up to 40 cm in height.

**Abundance:** Found on wave-swept benches, tide pools and on reef flats.

**Uses & Compound:** Used as fertilizer, as human food, fodder and medicine. Contains auxin-like substance, controls heavy metals pollution. Also used as source of alginate and considered as a good biomass source for biogas production.







### 32. *Sargassum vulgare* C.Agardh, 1820

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Fucales
Family	Sargassaceae
Genus	Sargassum
Species	vulgare
Common name	Gulf weed



**Description:** A brown seaweed, lithophytic on coral reefs, rocks and stones with a main axis to about 40 cm long, floating upright by means of gas bladders; at sheltered or exposed places of all tropical and subtropical shores from high tide level to sub-littoral.

**Abundance:** Most are found on firm sub-stratum in the shallow sub-tidal zone with 5 to 15 meter depth..

**Uses & Compound:** Used as food like sauces, condiments, spices, flavorings. Also used as medicines, fodder and fertilizer. Potential source of antifungal compounds.





### 33. *Styopodium zonale* (J.V. Lamouroux) Papenfuss, 1940

Taxonomy	Chlorophyta
Class	Phaeophyceae
Order	Dictyotales
Family	Dictyotaceae
Genus	Styopodium
Species	zonale
Common name	Leafy flat-blade alga



**Description:** Bushy plant formed by flat, squared-off blades that are irregularly branched and split. The dark-brown flat blades do not have a midrib and are not enrolled at the margins. Attached to the substrates with strong holdfast. Up to 30 cm high. Concentrically banded in wide range of colors, including shades of yellow, green and brown.

**Abundance:** Attach to rocky substrates in most reef environments. Often abundant in shallow water less than five feet, only occasionally reported on deeper reefs.

**Uses & Compound:** Used as medicine.





## RHODOPHYTA

### 1. *Acanthophora spicifera* (M. Vahl) Borgesen, 1910

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Ceramiales
Family	Rhodomelaceae
Genus	Acanthophora
Species	spicifera
Common name	Not known



**Description:** Plant bushy and erect, attached to the solid substrates by small disc like holdfast. Determinate branches are spirally arranged along the main axes. Each determinate branch is beset with numerous simple or compound spines short branch lets. Reddish to greenish in color. Size 15 to 20 cm tall.

**Abundance:** It grows on sandy rocks and stones in the intertidal and sub tidal regions.

**Uses & Compounds:** *Acanthophora spicifera* is consumed in Asia-pacific region. It is also used in vegetable salads, as soup flavoring and as a thickening agent, and is reported to contain carragenaans, used as an emulsifying agent.







## 2. *Actinotrichia fragilis* (Forsskål) Børgesen, 1932

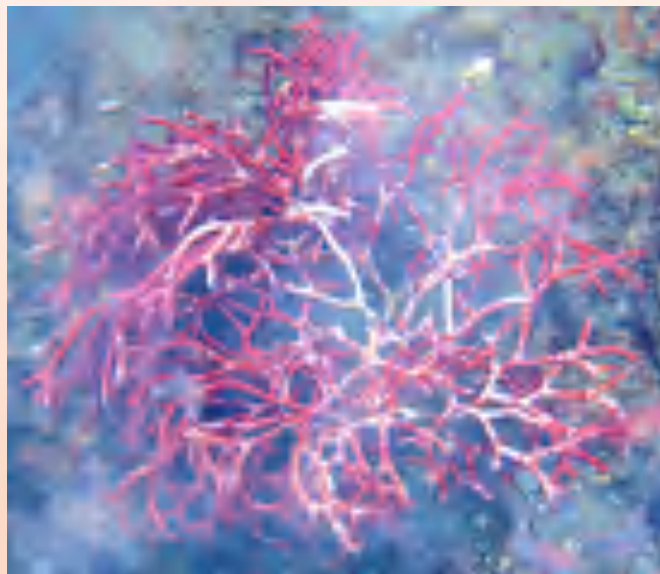
Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Galaxauraceae
Genus	Actinotrichia
Species	fragilis
Common name	Actinotrichia



**Description:** Generally filaments are red, branches are orange in color, thallium are cream to pink in color. Thallus about 7 cm high. Orange to red thallium were calcified, stiff and erect but somewhat sprawling, up to 8 cm in height. It arising from a discoid holdfast (3-5 mm diameter). Dichotomous branches (400-600  $\mu\text{m}$  diam.) occurred at intervals of 3-6 mm and angles of 40-60°, with distinct whorled assimilatory filaments.

**Abundance:** It grows on rock or coral platforms in the sub tidal and is found in 2.5 m depth.

**Uses & Compounds:** *A. fragilis* shows potential for production of fine chemicals and medical products. The red algae powder and gel contain bioactive components such as alkaloids, flavonoids, and terpenoids. They also contain essential amino acids like lysine, phenylalanine, and leucine.







### 3. *Amphiroa cryptarthrodia* Zanardini, 1843

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Corallinales
Family	Lithophyllaceae
Genus	Amphiroa
Species	cryptarthrodia
Common name	Not known



**Description:** The organisms possess secondary pit connection. The thalli is erect, bushy; endophytic base on other calcareous algae. Dichotomous branching, regular and geometric. This species can reach around 30 cm in size. Generally grow 2-4 cm high. *A. cryptarthrodia* dark red to pink violet in color, apart from lighter apices due to annular ridges.

**Abundance:** Grows on rocks in sheltered sites where it forms extended meadows. Recorded also in tidal pools. **Bathymetric distribution:** sublittoral, from surface to 10-25 m. depth

**Uses & Compounds:** Used on functional foods and pharmaceuticals, extracts has antifungal and antibiotic activity. *A. cryptarthrodia* shows potential for production of food and medical products.





#### 4. *Amphiroa fragilissima* (Linnaeus) J.V. Lamouroux, 1816

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Corallinales

Family □ Lithophyllaceae

Genus □ *Amphiroa*

Species □ *fragilissima*

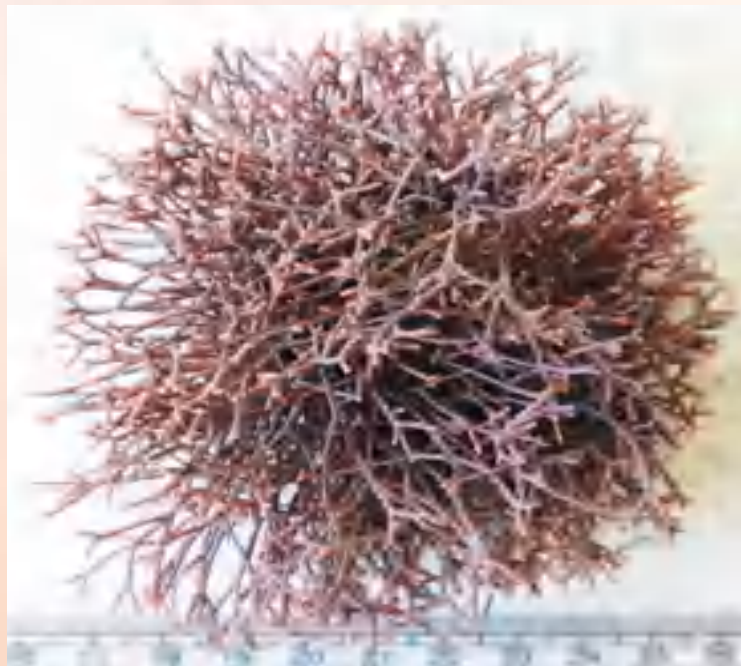
Common name □ Not known



**Description:** The plants have strongly calcified, dichotomous, cylindrical branches with obtuse apices. *A. fragilissima* grows upright about 2.5-4.0 cm high. The seaweed is pink in color.

**Abundance:** This seaweed is found on rocks in sub tidal zones along moderately wave exposed shorelines.

**Uses & Compounds:** *A. fragilissima* commercially used as food and fertilizers. Also used as functional food and fertilizers.





## 5. *Amphiroa rigida* J.V. Lamouroux, 1816

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Corallinales
Family	Corallinaceae
Genus	Amphiroa
Species	rigida
Common name	Twig algae



**Description:** The *Amphiroa rigida* is a hard, calcified alga, articulated, irregular and dichotomously branched. The dichotomous branching often occurs in the midst of a joint or at its edge. The joints are solid and maintain their shape, even after the alga has dehydrated. Generally 2.5-6 cm high. Various shades of pink ranging from gentle to vivid. When dry, the alga turns white.

**Abundance:** Often attached to rock or dead corals in sea grass beds and reef areas.

**Uses & Compounds:** Extracts have antimicrobial, antifungal, cytotoxic and antimitotic activity.







## 6. *Asparagopsis taxiformis* (Delile) Trevisan, 1845

Taxonomy □ Chlorophyta	
Class □	Florideophyceae
Order □	Bonnemaisoniales
Family □ □	Bonnemaisoniaceae
Genus □	<i>Asparagopsis</i>
Species □	<i>taxiformis</i>
Common name □	Cat's tail red seaweed



**Description:** Creeping holdfast giving rise to erect blades. Stipe soft, smooth and nude without branches or blades. All branches located at top of the stipe. Branching plume-like appearing as soft feathery tufts. Erect branches up to 13 cm tall. Greenish to reddish in color.

**Abundance:** It grows below the low tide mark on edges of reefs or on shallow pools and occurs almost throughout the year.

**Uses & Compounds:** Used as human food, animal fodder and medicine. The alga is considered a delicacy, with penetrating flavor and taste and fragrance of iodine which develops when allowed to stand. It is used for controlling goiter. It can also be applied as fertilizer. The species has been examined for its potential as a source of pharmaceutical and bioactive agents since its extracts contain antifouling and anticyanobacterial, antifungal, anticoagulant and antimicrobial compounds.







## 7. *Bangia fuscopurpurea* (Dillwyn) Lyngbye, 1819

Taxonomy	Chlorophyta
Class	Bangiophyceae
Order	Bangiales
Family	Bangiaceae
Genus	Bangia
Species	fuscopurpurea
Common name	Velvet thread weed



**Description:** Gelatinous, unbranched, blackish-purple filaments, at first uniseriate later multiseriate, attached by rhizoidal outgrowths from basal and adjacent cells. Cells with central star-shaped rhodoplast with pyrenoid. Pale yellowish brown to generally brownish purple. Male plant yellowish red, female plant purple or purplish red.

**Abundance:** *Bangia* grows in freshwater or in marine habitats, usually forming dense clumps or mats, and occur throughout the intertidal area and sub tidally to the maximum depth at which benthic algae occur. The plants are usually attached to a solid substratum (rock or shell), but can also occur as epiphytes attached to other algae.

**Uses & Compounds:** Used as animal feed.





## 8. *Callophyllis rangiferina* (R. Brown ex Turner) Womersley, 1973

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Gigartinales

Family □ Kallymeniaceae

Genus □ *Callophyllis*

Species □ *rangiferina*

Common name □ Carola

**Description:** Thallus medium to dark red, with branches essentially in one plane but often displaced, with one to several axes profusely branched in an irregularly lateral to flabellate or sub dichotomous manner. Thallus usually 200-300  $\mu\text{m}$  thick near apices, consisting of a medulla of large, ovoid, and usually thick-walled cells, irregularly arranged and with intermixed small ovoid to elongate cells; cortex of several layers of irregularly ovoid cells, smaller outwards, with the outermost cells in surface view closely packed. Holdfast discoid, 2-5 mm across; epilithic.

**Abundance:** Occur in sub tidal or intertidal areas, where they are anchored to rocky substrates (or occasionally to other algae) by a discoid holdfast.

**Uses & Compounds:** Not known



## 9. *Callophyllis variegata* (Bory de Saint-Vincent) Kutzing, 1843

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Kallymeniaceae
Genus	Callophyllis
Species	variegata
Common name	Large wire weed

**Description:** The thallus, typically made up of flat, sometimes deeply and irregularly divided branches and glossy or semi-glossy blades (leaf like structures), extends upward from the holdfast, sometimes supported on a short stripe (stem like stalk). The blades, which lack midribs and veins, have large cells in the medulla (central region) and ragged or smooth margins.

**Abundance:** It is a perennial taxon that is epiphytic on larger algae, as well as occurring on rocks, sponges, and hydroids.

**Uses & Compounds:** *Callophyllis variegata* is an edible species used in salads and soups in Asian countries.



## 10. *Champia parvula* (C. Agardh) Harvey, 1853

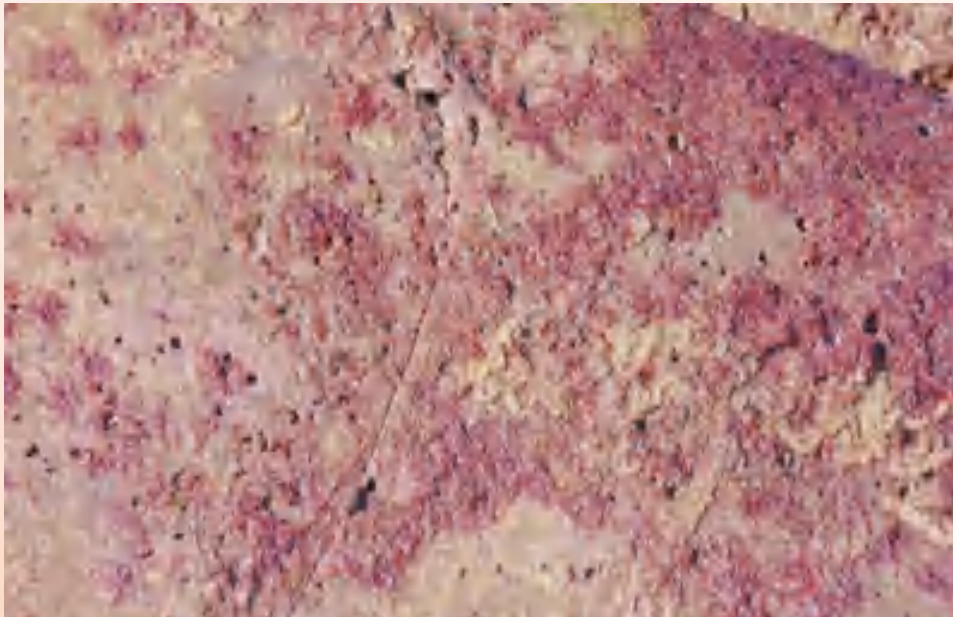
Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Rhodimoniales
Family	Champiaceae
Genus	Champia
Species	parvula
Common name	Little fat sausage weed



**Description:** Soft, gelatinous, pinkish red, much-branched fronds, densely matted, with blunt apices, to 100 mm high. Axes segmented, with nodal diaphragms, segments about as broad as long, filled with a watery mucilage. Pinkish red in color.

**Abundance:** Epiphytic on smaller algae in lower intertidal pools and sub tidal.

**Uses & Compounds:** Extracts have anticoagulant, antiherpetic activity.







## 11. *Chondrus crispus* Stackhouse, 1797

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Gigartinaceae
Genus	Chondrus
Species	crispus
Common name	Pearl moss, Jelly moss, Rock moss



**Description:** Cartilaginous, dark purplish-red, red, yellowish or greenish fronds to 150 mm high, gametophyte plants are often iridescent under water when in good condition. Stripe compressed, narrow, expanding gradually to a flat, repeatedly dichotomously branched frond, in tufts from a discoid holdfast. Variable in branching, color and thickness.

**Abundance:** On rocks, lower intertidal and shallow sub tidal, in pools in the mid-intertidal in some locations; often abundant and zone-forming at low water.

**Uses & Compounds:** *C. crispus* is an industrial source of carrageenan, which is commonly used as a thickener and stabilizer in milk products such as ice cream and processed foods, including lunch meat. It may also be used as a thickener in calico printing and paper marbling, and for fining beer or wine. Carrageenan and agar-agar are also used in Asia for gelatin-like desserts, such as almond jelly.





## 12. Chrysomenia J.Agardh, 1842

Taxonomy □ Chlorophyta	
Class □	Florideophyceae
Order □	Rhodimoniales
Family □	Rhodimeniaceae
Genus □	Chrysomenia
Species	
Common name □	Golden membrane weed



**Description:** The texture is slippery, but somewhat firm and succulent. The blade surface is rough, bumpy, locally corrugated. The blade is essentially hollow and filled with mucilage but transversely oriented struts are present. The thallus is erect, simple, foliose. The color is dull reddish when the specimen is pressed.

**Abundance:** Most species of Chrysomenia are found in tropical or subtropical waters. Plants occur mainly in the sub tidal at depths of up to 50 m.

**Uses & Compounds:** Not known





### 13. *Dermonema pulvinatum* (Grunow) Fan, 1962

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	<i>Dermonema</i>
Species	<i>pulvinatum</i>
Common name	Not known



**Description:** The seaweed is erect, clustered, hemispherical or mat-like, and consists of a number of irregular bifurcated cylindrical branches. The algae is dark brown or tan, the main axis is not obvious, and the height is about 1-3 cm. The base of the spindle has a disc-shaped applicator. The branch diameter is 0.8-1 mm. The main branch has 2-3 irregular branches with short forks, and the ends are bifurcated antlers.

**Abundance:** Growing on rocks in the middle and high tide belts.

**Uses & Compounds:** Not known







#### 14. *Dichotomaria obtusata* (J. Ellis & Solander) Lamarck, 1816

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Galaxauraceae
Genus	Dichotomaria
Species	obtusata
Common name	Not known



Description: Sub dichotomously branched and clearly segmented, segments ovoid to elongate, rounded at both ends, 7-19 mm long, 3-5 mm broad. Holdfast discoid, 2-10 mm across; epilithic. Rhodoplasts campanulate with a central pyrenoid. 5-14 cm high. Thallus dark red to chalky grey-red.

Abundance: Tropics in general, occasionally in temperate areas.

Uses & Compounds: The macroalgae are considered to be a rich source of bioactive substances suitable for therapeutic medical applications including use as an anticoagulant, antiprotozoal, antibacterial, antifungal, antiviral, antioxidant, antitumoral, anti-inflammatory and analgesics.







### 15. (Withering) Le Jolis, 1863

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Dumontiaceae
Genus	Dudresnaya
Species	verticillata
Common name	Dudresnay's whorled weed



Description: Gelatinous, bushy, crimson fronds. Central axis polysiphonous, much branched, clothed with close-set whorls of short, repeatedly dichotomously branched monosiphonous ramuli, 3-4 mm wide and 250 mm long.

Abundance: Growing on rocks in low intertidal and sub tidal zones.

Uses & Compounds: Not known





## 16. *Eucheuma cottonii* (Weber Bosse, 1913)

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Gigartinales

Family □ Solieriaceae

Genus □ *Eucheuma*

Species □ *cottonii*

Common name □ Not known



**Description:** This seaweed has no roots but some of its branches can attach to corals and grow. They show a triphasic life cycle, consisting of a gametophyte (n) (dioecious), carposporophyte (2n), and the saprophyte (2n). Both the gametophyte and the more robust sporophyte stage are significant to the development of the seaweed, where their characteristics allow for increased vegetative regeneration.

**Abundance:** The algae are typically found below the low tide mark to the upper sub tidal zone of a reef, growing on sand to rocky seafloor areas along a coral reef, where water movement is slow to moderate.

**Uses & Compounds:** This seaweed is a good vegetarian source of calcium and phosphorus for building strong bones. In fact *Eucheuma* seaweed contains 600 times more calcium than that found in animal sources of calcium. *Eucheuma* Seaweed also helps to lower blood pressure. Used in the production of carrageenan, an ingredient for cosmetics, food processing, and industrial manufacturing, as well as a food source for people in Asian countries. The seaweeds were high in ash and dietary fibers and low in lipid content.





### 17. *Eucheuma spinosum* J.Agardh, 1847

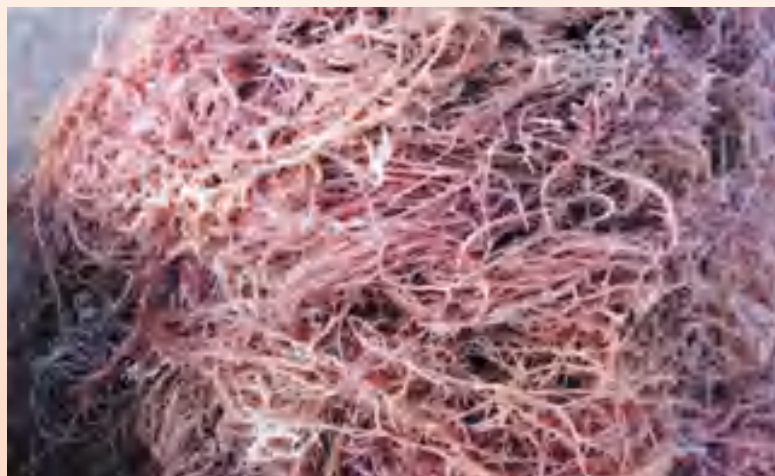
Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Solieriaceae
Genus	Eucheuma
Species	spinosum
Common name	Agar-agar kasar



**Description:** *Eucheuma spinosum* has an upright round thallus shape, transparent. The surface of the thallus is covered by a bulge that is shaped like pointed spines irregular, the spines are elongated as if they were branch. Plants stand up because lush branches can form clump. Branching of thallus grows in parts that are old or young irregular. Size 5-30 cm long. Yellowish brown to yellowish red.

**Abundance:** This species was abundant at sites with shallow depth and moderate water.

**Uses & Compounds:** Used in the production of carrageenan, an ingredient for cosmetics, food processing, and industrial manufacturing, as well as a food source. Having antioxidant and antibacterial properties. Used as cosmetic ingredient for skin conditioning.







### 18. *Galaxaura oblongata* (J. Ellis & Solander) J.V. Lamouroux, 1816

Taxonomy □ Chlorophyta

Class □ Florideophyceae

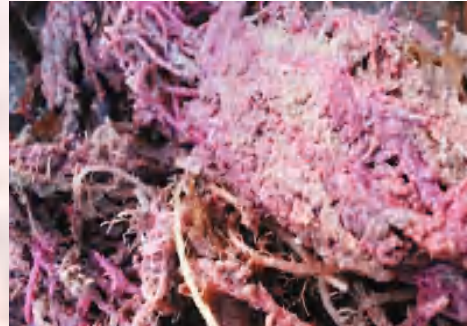
Order □ Nemaliales

Family □ Galaxauraceae

Genus □ *Galaxaura*

Species □ *oblongata*

Common name □ Not known



**Description:** *G. oblongata* has a triphasic life history with conspicuous gametophytes and small filamentous tetrasporophytes. Jointed, calcareous branches that terminate in two at the tip. Thalli calcified with of 5- 10 cm tall. Pale pinkish in color.

**Abundance:** Occurring abundantly on rocky reefs, rocks.

**Uses & Compounds:** Not known







### 19. *Galaxaura rugosa* (J. Ellis & Solander) J.V. Lamouroux, 1816

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Galaxauraceae
Genus	Galaxaura
Species	rugosa
Common name	Not known



Description: Although they are sometimes attached to the tubes of polychaete worms. Thallus bushy, stiff, compact, forming hemispherical mounds. Branching irregularly dichotomous; calcification moderate, branches cylindrical. Dark red-brown in color.

Abundance: Plants usually grew on rocky substrata from 0-10 m depths.

Uses & Compounds: Extracts have anticoagulant and antioxidant activity.





## 20. *Ganonema pinnatum* (Harvey) Huisman, 2002

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Nemaliales

Family □ Liagoraceae

Genus □ *Ganonema*

Species □ *pinnatum*

Common name □ Not known



Description: Thallus moderately calcified, with percurated axes, peniculate, when pressed appearing alternate to subopposite. Axes 1.5 mm in diameter, tapering to apices and smaller lateral branches 0.5 mm in diameter. Assimilatory filaments sparsely dichotomously branched, often unbranched and curved in distal regions. Apical cell hemispherical. Terminal granular cells and hairs common. Thallus up to 11 cm high. Pale pink to whitish in color.

Abundance: Abundant on rocks in shallow water.

Uses & Compounds: Not known





## 21. *Gelidium pusillum* (Stackhouse) Le Jolis, 1863

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gelidiales
Family	Gelidiaceae
Genus	<i>Gelidium</i>
Species	<i>pusillum</i>
Common name	Dwarf gelidium



**Description:** Cartilaginous, turf-forming, arising from an extensive creeping base and incorporating shell debris and small molluscs. Erect fronds flattened and leaf-like and 0.5-2 mm broad and 2-10 mm high. Purplish or blackish red in color.

**Abundance:** Distribution on rock in upper intertidal forming extensive mat-like growths, particularly on vertical or near-vertical surfaces. Epilithic in the midlittoral, lower littoral and occasionally in the upper sub littoral.

**Uses & Compounds:** It is one of the potential species as source of agar.







## 22. *Gracilaria corticata* (J. Agardh) J. Agardh, 1852

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gracilariales
Family	Gracilariaceae
Genus	Gracilaria
Species	corticata
Common name	Not known



**Description:** Branching frequently, becoming more dense in upper parts of the plant; mostly dichotomous, up to many orders; rarely, fine laterals extend from the blades producing bushy appearance; multipartite at points of damage. Thallus erect, arising singly from a discoid holdfast. Axes compressed, almost cartilaginous; constricted at the base in basal branches. Blades linear, up to 15 cm long, up to 4 mm wide; apices generally obtuse, acute in finer branches. Blade surface and margins smooth. Fresh specimens purple to green and firm but pliable; dried specimens black to green. Large galls/tumors often evident on the surface of mature blades. The color of the plants vary from deep purple to grass green.

**Abundance:** Inhabiting temperate and tropical seawaters, covering from intertidal to sub tidal areas.

**Uses & Compounds:** It commercially used as food, feed and industrial purposes for the production of agar and also consumed in the form of porridge by coastal people. *G. corticata* contained sulphated polysaccharide, fucoidan, flavonoids, phlorotannins, etc. as a major constituents. These bioactive components and various extracts exhibited substantial valuable therapeutic potential.







### 23. *Gracilaria textorii* (Suringar) De Toni, 1895

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Gracilariales

Family □ Gracilariaceae

Genus □ *Gracilaria*

Species □ *textorii*

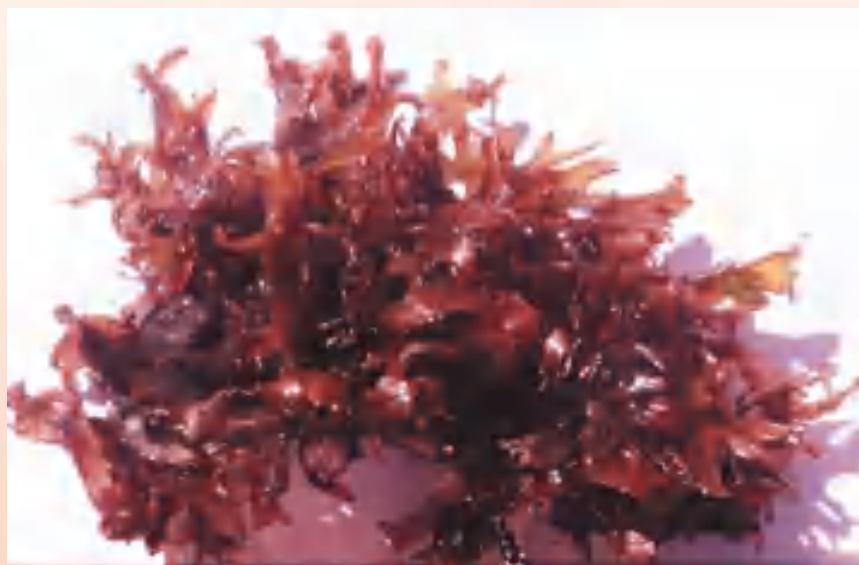
Common name □ Lablabig



**Description:** The plants are erect and have flat blades that are slick, coriaceous, with round tips. Secondary holdfasts extend from the blade edges. Thallus to 8 cm tall, deep red to brownish red, arising from a discoid holdfast, distinctly flattened; branches 4-8 mm broad, with lateral branches arising from the blade margins, slightly thinner at insertion and curving toward the apex. It is dark red or purple in color.

**Abundance:** This seaweed is found on rocks which are frequently covered with coral sand in lower intertidal to sub tidal zones along shorelines with calm to moderate wave activity.

**Uses & Compounds:** Used as fodder/animal feed, stimulants, biofuels, beverage base, food additive, gum/mucilage, vegetable, fertilizer, mulches, propagation material.





## 24. *Gracilaria tikvahiae* Mc Lachlan, 1979

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gracilariales
Family	Gracilariaceae
Genus	Gracilaria
Species	tikvahiae
Common name	Not known



**Description:** Branching mostly dichotomous, but can be highly irregular, with dichotomous below, alternate above and dichotomous at apices. Apices tapered and pointed, often unevenly forked with one side longer than the other. Axes compressed or flattened, with short laterals bearing more slender than axes with spinous branch lets. Thallus 12-15 cm tall, comprised of finely branched clumps, irregularly branched, 1mm wide. In the wild, the plant can range from dark green to shades of red and brown. Cultured plants are often very dark green to nearly black.

**Abundance:** Inhabiting temperate and tropical seawaters, covering from intertidal to sub tidal areas.

**Uses & Compounds:** World agar production is estimated at 7,000 to 10,000 tons annually, and about half is from *Gracilaria tikvahiae*. Used as fodder/animal feed, stimulants, biofuels, beverage base, food additive, gum/mucilage, vegetable, fertilizer, mulches, propagation material.





## 25. *Gracilaria verrucosa* (Hudson) Papenfuss, 1950

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gracilariales
Family	Gracilariaceae
Genus	Gracilaria
Species	verrucosa
Common name	Thin dragon beard plant, Ceylon moss



**Description:** Plants bushy, with age often becoming free, texture firmly fleshy. Branches 0.5-2 mm diameter, repeatedly dividing, alternately or occasionally dichotomously branched with numerous lateral proliferations, terete throughout, tapering to the ultimate branchlets. Color dull purplish, grayish or greenish translucent.

**Abundance:** Inhabiting temperate and tropical seawaters, covering from intertidal to sub tidal areas.

**Uses & Compounds:** *Gracilaria* has played an important role in the production of agar. It is used as raw material for agar manufacture. It is also eaten raw as salad or cooked with vegetables, animal feed. The polysaccharides and crude fiber reached 63.10%-75.97% of the total *Gracilaria* and dietary fiber was about 80%-90% of the total carbohydrates. So *Gracilaria* might be a health food which provided high dietary fiber, high protein, low fat and calorie, rich minerals and vitamins.







## 26. *Grateloupia lanceolata* (Okamura) S. Kawaguchi, 1997

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Halymeniales
Family	Halymeniaceae
Genus	Grateloupia
Species	lanceolata
Common name	Narrow iodine seaweed



**Description:** Upright blades, membranous, lubricous in texture, are attached to the substratum by means of discoidal holdfast of 7-20 mm in diameter. Blades, lanceolate foliose, are stipitate, simple, branched dichotomously to pately and complicate. Margin entire or sometimes finely serrate in old fronds. Thallus is multiaxial and consists of compact cellular cortex and a filamentous medulla. Size 10-70 cm long. Dull rose-reddish to brownish in color.

**Abundance:** Abundant on rocks in the low intertidal zone exposed to heavy surf.

**Uses & Compounds:** Could be used as an edible anti-obesity agent.





## 27. *Grateloupia livida* (Harvey) Yamada, 1931

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Halymeniales

Family □ Halymeniaceae

Genus □ *Grateloupia*

Species □ *livida*

Common name □ Not known



**Description:** The blade, 200-450 mm thick, has a short stripe and smooth margins. Marginal proliferations usually develop only in eroded areas or as a result of damage or grazing. The blade is also thinner (130-250 mm) and characterized by a long stripe, and frequent marginal proliferations. Color purplish-red, purple or brownish; dark green, off-white, drab or orangey by bleaching; characteristic emerald green color to the blade base, usually with scattered paler spots.

**Abundance:** Abundant on rock in pools, mid-intertidal to shallow sub tidal zones.

**Uses & Compounds:** Because of the antimicrobial and antischistosomal activities of *G. livida*, it is used as a febrifuge, an antidiarrhoeic, an antibacterial and an anthelmintic agent for the treatment of ascariasis and seat worm infections, sore throat, stomach ache and dysentery treatment.





## 28. *Halymenia dilatata* Zanardini, 1851

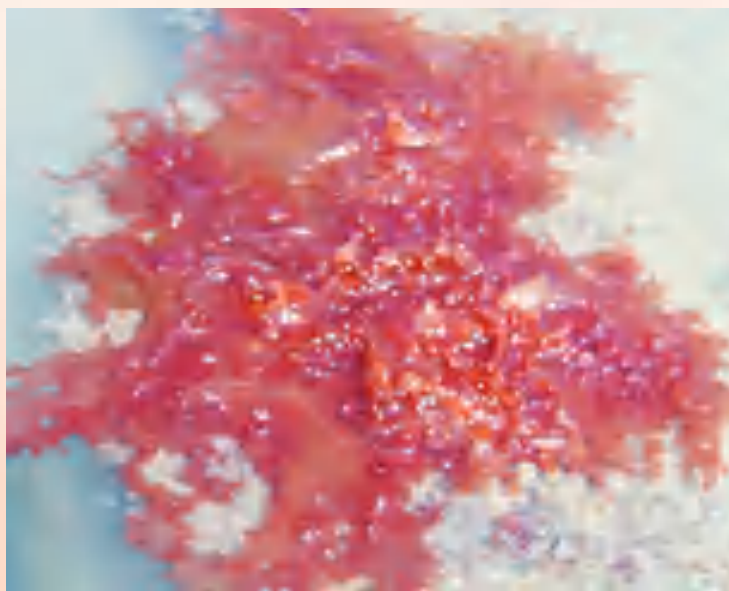
Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Halymeniales
Family	Halymeniaceae
Genus	Halymenia
Species	dilatata
Common name	Dragons breath algae



**Description:** Thalli gelatinous-membranous, attached by small scutate disc; sessile or shortly stipitate, with large transversely expanded blade, broadly oblong or irregularly lobed, 10-20 (-40) cm wide, undulate-curved, simple or lobed; base reniform. Cortex thin, with 3-5 cell layers; outermost cells shaped like rabbit ears; medullary filaments running in various directions, with highly refractive stellate cells. Spermatangial sori covering the margins of the thallus. Size 10-15 cm tall, 350-400  $\mu$ m thick. Purplish-red with shades of green in color.

**Abundance:** Epilithic lower mid littoral zone and infra littoral fringe, on rock, shady pools etc.

**Uses & Compounds:** This seaweed is used as food for both human and animal.







## 29. *Halymenia venusta* Børgesen, 1932

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Halymeniales
Family	Halymeniaceae
Genus	Halymenia
Species	venusta
Common name	Not known



**Description:** Plants slightly lubricous, large and attached by small basal discs. Fronds foliose, variable in shape, palmately divided into several lobes. Margins and surface of the blades are densely proliferated, repeatedly divided, narrow with sharply acute tips. Size 30 cm tall. Plants light rose red in color.

**Abundance:** Lower mid littoral zone and infra littoral fringe.

**Uses & Compounds:** Source of carrageenan.





### 30. *Helminthocladia australis* Harvey, 1863

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	Helminthocladia
Species	australis
Common name	Not known

**Description:** Thallus, with one to many terete, irregularly and usually profusely branched axes 2-10 mm in diameter below, branches 1-3 mm in diameter above. Older axes and branches sometimes denuded below. Hold fast discoid, 2-5 mm across; epilithic. Structure of a medulla of moderately robust filaments, 8-20  $\mu\text{m}$  in diameter near branch apices. Size 10-40 cm high. Thallus brown to purple in color.

**Abundance:** A common species in areas of moderate to slight wave action, though patchy in its occurrence. Abundant on rock in the lower intertidal and shallow water on moderately rough coasts

**Uses & Compounds:** Not known



### 31. *Hildenbrandia rubra* (Sommerfelt) Meneghini, 1841

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Hildenbrandiales
Family	Hildenbrandiaceae
Genus	Hildenbrandia
Species	<i>rubra</i>
Common name	Rusty rock



**Description:** It is very thin (0.3 mm or 0.01 in thick), can appear partly transparent, and grows very slowly. Thallus is an uncalcified crust that adheres tightly to rock. Tetra sporangia, which are irregularly divided and occur in conceptacles, are the only known form of reproduction. Rose-red or brownish-red crusts in color.

**Abundance:** Habitat on rocks and stones at all tidal levels, often in splash zone in caves, and sub tidal, widely distributed, extremely abundant, particularly in upper shore where it appears to be very tolerant to extremes of temperature, light and salinity.

**Uses & Compounds:** Not known







### 32. *Hydrolithon onkodes* (Heydrich) Penrose & Woelkerling, 1992

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Corallinales
Family	Hydrolithaceae
Genus	Hydrolithoideae
Species	onkodes
Common name	Not known

**Description:** Thallus non-geniculate, flat to low lumpy when conforming to substratum, lacking protuberances. Margins adherent, entire to lobed, lacking orbital ridges. Surface smooth, cell surface Phymatolithon-type. Color pale grayish pink in well-lit situation.

**Abundance:** *Hydrolithon onkodes* is one of the most common corallines in the shallower area of the reef (< 10 m), where it occurs both on sandstone bedrock and old stony coral. It is most abundant on the area of the reef.

**Uses & Compounds:** Not known



### 33. *Hypnea cornuta* (Kützing) J. Agardh, 1851

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Cystocloniaceae
Genus	Hypnea
Species	cornuta
Common name	Not known

**Description:** The *Hypnea cornuta* generally resembles the *Hypnea musciformis*. The two are sometimes found together, but the branches of the *H. cornuta* occupy more extreme habitats. Its branches are thinner than those of the *H. musciformis*, and two or three-horned starry hairs grow from each hook-like branch. The alga grows up to 20 cm in length. The branches are one mm in diameter. The colors vary from olive-green to brown or light tan that is nearly colorless.

**Abundance:** The *Hypnea cornuta* is resilient to extreme conditions. It grows in weathering pits that are infrequently replenished with water by waves. These pits are subject to extreme temperature change, rising salinity levels and drops in gas solubility. The seaweed also grows in areas polluted by sewage, and may also be found in tidal pools and potholes upon an abrasion platform, usually, though, not along the edge - as opposed to the *H. musciformis*.

**Uses & Compounds:** Used as animal feed. Also used for carrageen extraction.



### 34. *Hypnea esperi* Bory, 1828

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Cystocloniaceae
Genus	Hypnea
Species	esperi
Common name	Not known



**Description:** Thallus non-geniculate, flat to low lumpy when conforming to substratum, lacking protuberances. Margins adherent, entire to lobed, lacking orbital ridges. Surface smooth, cell surface Phymatolithon-type. Color pale grayish pink in well-lit situation.

**Abundance:** Hydrolithon onkodes is one of the most common corallines in the shallower area of the reef (< 10 m), where it occurs both on sandstone bedrock and old stony coral. It is most abundant on the area of the reef.

**Uses & Compounds:** Not known







### 35. *Hypnea flexicaulis* Y. Yamagishi & M. Masuda, 2000

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Gigartinales

Family □ Cystocloniaceae

Genus □ *Hypnea*

Species □ *flexicaulis*

Common name □ Not known



**Description:** Thalli are fleshy or sub cartilaginous, with an entangled base of creeping branches. Axes and first order branches are flexuous and upper branches are shaped like antlers. Main axis is terete throughout, obscurely per current, branching in an alternate spiral manner at an angle. Upper ordinary branch lets and adventitious branch lets are sometimes curved or hooked to abaxial or irregular directions. Axial cells are elongated and slender in longitudinal section. Each paraxial cell and cortical cell has secondary pit connections, without lenticulae thickening on its walls. Greenish-yellowish or brownish red in color.

**Abundance:** *Hypnea flexicaulis* grows gregariously in the lower intertidal to upper sub tidal zones on somewhat sheltered coasts.

**Uses & Compounds:** Used as carrageenan production.





### 36. *Hypnea musciformis* (Wulfen) J.V. Lamouroux, 1813

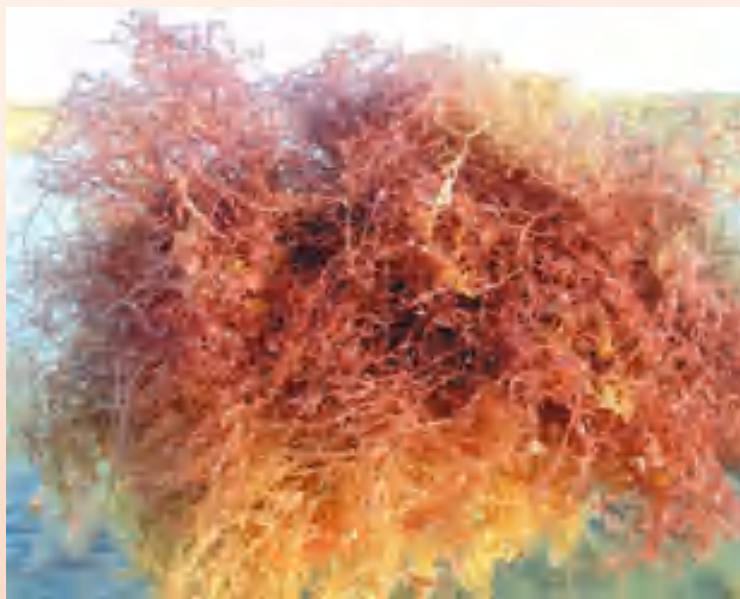
Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Cystocloniaceae
Genus	Hypnea
Species	<i>musciformis</i>
Common name	Hooked weed



**Description:** Plant attached to the substratum by small discoid holdfast. Thallus cartilaginous and erect. The thallus is always covered with calcareous materials. The plant appears in the form of pyramid. Size 10 - 20 cm tall. Reddish to purple in color.

**Abundance:** Low intertidal and shallow sub tidal reef flats, frequently entangled on *Sargassum* spp. Epiphytic on various other algae, or directly attached to sandy flat rocks.

**Uses & Compounds:** *H. musciformis* is an important carrageenan resource. Used as animal feed and fertilizer. It contained all the essential amino acids, which accounted for 53.89% of the total amino acids.





### 37. *Hypnea pannosa* J.Agardh 1847

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Cystocloniaceae
Genus	Hypnea
Species	pannosa
Common name	Blue hypnea



**Description:** Thallus as dense low mats or in tightly knit clumps, bushy, tangled, tough and wiry. Branches cylindrical to slightly compressed, 1-3 mm diameter, attached to one another by small adhesive cushions. Branch lets spine or spur-like, numerous, growing in any direction; tips tapering to sharp points. Holdfast initially pad-like, secondarily attached to adjacent branches by cushion-like pads. Dark to light purple-red color, occasionally with blue or green iridescence.

**Abundance:** Generally epilithic in the intertidal or shallow sub tidal.

**Uses & Compounds:** It is a carrageenan yielding plant. This seaweed is also edible and the freshly gathered seaweed is commonly prepared as salad. *H. pannosa* contained all the essential amino acids, which accounted for 52.27% of the total amino acids.







### 38. *Hypnea valentiae* (Turner) Montagne, 1841

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Cystocloniaceae
Genus	Hypnea
Species	valentiae
Common name	Not known



**Description:** The Plants are erect and laxly branched with distinct or percussent cylindrical main axis varying in thickness. Branches are simple and filiform (thread like) but occasionally forked and are distinctly oriented at right angle to the axis; stichidia (inflated branches) are seen as swollen bands at the middle, near the base or rarely near the tips of the ultimate branch lets. Size 10-30 cm high. Thallus medium to dark red-brown in color.

**Abundance:** Common in sheltered localities but where there is appreciable current flow, from shallow water to 10 m depth.

**Uses & Compounds:** It is a carrageenan yielding plant. This seaweed is also edible and the freshly gathered seaweed is commonly prepared as salad. *Hypnea valentiae* composed of 12 fatty acids, 8 of which were unsaturated fatty acids and 4 were saturated fatty acids.





### 39. *Jania rubens* (Linnaeus) J.V. Lamouroux, 1816

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Corallinales
Family	Corallinaceae
Genus	<i>Jania</i>
Species	<i>rubens</i>
Common name	Slender-beaded coral weed



**Description:** Slender, articulated, calcified fronds, in rounded bunches. Repeatedly dichotomously branched, luxuriant specimens secondarily pinnate. Segments cylindrical, those bearing branches somewhat compressed. Fixed by small conical disc, but spreading vegetatively by developing attachment discs from branches in contact with solid substrata. Size 15 to 40 mm high. Rose-pink in color.

**Abundance:** Epiphytic, only found growing epiphytically on older plants of the brown algae *Cladostephus spongiosus* and at the base of old, long-established *Cystoseira* species in the lower intertidal, southern and western shores, often abundant.

**Uses & Compounds:** *Jania rubens* is used by cosmetic industry as an extract in natural beauty products. It is prized for its ultra-moisturizing and protective properties due to the high concentration of minerals and trace elements present in its tissue. This seaweed is characterized by a concentration of minerals and trace elements 20,000 to 40,000 times greater than that of seawater, thus giving it remineralizing properties. It is also used in skin whitening and hydrating products.





#### 40. *Kappaphycus alvarezii* (Doty) Doty ex P.C. Silva, 1996

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Solieriaceae
Genus	<i>Kappaphycus</i>
Species	<i>alvarezii</i>
Common name	Elkhorn sea moss



**Description:** *Kappaphycus alvarezii* is a tough, fleshy, firm seaweed. Its coarse thalli are approximately 1/2 inch in diameter. The thalli are heavy, with major axes relatively straight, lacking secondary branches near the tips. It is frequently and irregularly branched, most branches primary. It is up to 2 m tall. Shiny green to yellow orange in color.

**Abundance:** It has a variable form, from a few small branches in shallow water to tangled and gnarled in deeper water, and it may be loosely attached to broken coral or floating, sometimes in large, moving mats. It typically occurs in waters 3 to 50 feet deep.

**Uses & Compounds:** *K. alvarezii* is a source of carrageenan which is used as an additive in food, pharmaceutical and cosmetic products. Also used as food items. Rich sources of vitamin antioxidants namely Vitamin C, total carotenoid, beta carotene, total chlorophyll and polyphenol.







#### 41. *Laurencia obtusa* (Hudson) J.V. Lamouroux, 1813

Taxonomy □ Chlorophyta	
Class □	□ Florideophyceae
Order □	□ Ceramiales
Family □	□ Rhodomelaceae
Genus □	□ Laurencia
Species □	□ obtusa
Common name □ R	ounded brittle □
□	□ fern weed



**Description:** Globose tufts of brittle, cartilaginous, narrow, cylindrical, reddish brown to yellowish red fronds, 150 mm long, from small discoid base. Axis simple, branches patent, often opposite, spirally arranged, shorter towards apex giving irregularly pyramidal outline.

**Abundance:** Usually epiphytic, annual, lower intertidal, widely distributed, occasional to frequent.

**Uses & Compounds:** Could be used as pharmaceutical purpose.





#### 42. *Liagora ceranoides* J.V. Lamouroux, 1816

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	Liagora
Species	ceranoides
Common name	Not known



**Description:** This species is heavily calcified and ramiform. The branches are cylindrical and dichotomous. The apical portions are slightly calcified as the rest of the plant, and are bifurcate, cylindrical, downward curving, and have an obtuse tip. Pale pink to grey in color.

**Abundance:** The plants are found on rocks or gravel in lower intertidal zones along calm to moderately wave exposed shorelines.

**Uses & Compounds:** Not known





### 43. *Liagora donaldiana* I.A. Abbott & Huisman, 2003

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	Liagora
Species	donaldiana
Common name	Not known



**Description:** Plant heavily calcified, dichotomously branched, sometimes with proliferous lateral branches. Axes 1-1.2 mm in diameter, generally with prominent annulations. Assimilatory filaments up to 300 microns long, di- to trichotomously divided, with trichotomies occurring mostly in outer cortex; lower cells elongate, 7-20 microns in diameter, outer cells clavate or obovoid, 5-10 microns in diameter, equal in diameter to or larger than subtending cells. Plants monoecious or dioecious. Plant up to 11 cm in height.

**Abundance:** The plants are found on rocks or gravel in lower intertidal zones along calm to moderately wave exposed shorelines.

**Uses & Compounds:** Not known.







#### 44. *Liagora hawaiiiana* Butters, 1911

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	Liagora
Species	hawaiiiana
Common name	Not known



**Description:** Plants dichotomously branched with long segments, 5-13 mm between dichotomies, axils somewhat divaricated but becoming acute when the calcification cracks. Axes terete, heavily calcified, smooth, brittle with age, sometimes with striations. Structure multiaxial, with a central medulla of longitudinally aligned filaments bearing anticlinal assimilatory fascicles. Plants dioecious or monocious. White to pale pink in color.

**Abundance:** Intertidal, favoring exposed eroded coral reefs and edges of platforms.

**Uses & Compounds:** Not known





#### 45. *Liagora perennis* I.A. Abbott, 1995

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	Liagora
Species	perennis
Common name	Not known



**Description:** The plants are relatively short (3- 5 cm tall), with narrow axes and branches, and moderately thick calcification. One assimilatory (cortical) duster, arising from a medullary cell and showing several terminal haizs at ends of cortical filaments cells. Four-celled carpogonial branch after fertilized carpogonitm has divided transversely and each cell has redivided to form gonirnoblast filaments. Irregularly branched vegetative filaments around developing gonimoblast ate involucrel filaments, some of which are labeled IN. Arrow points to broken-off gonimoblast filament now lying on top of carpogonial branch.

**Abundance:** Intertidal, favoring exposed eroded coral reefs and edges of platforms.

**Uses & Compounds:** Not known







#### 46. *Liagora valida* Harvey, 1853

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	Liagora
Species	valida
Common name	Not known



Description: Thalli calcified, upright, attached to the substratum by a discoid holdfast, with a texture ranging from firm and chalky to soft and mucilaginous. Axes terete, dichotomously to irregularly divided or with per current axes, often with many short lateral branches.

Abundance: On rocks from near the high-water mark, in exposed positions, down to a depth of at least one meter (low-tide).

Uses & Compounds: Not known.







#### 47. *Liagora viscida* (Forsskål) C. Agardh, 1822

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	Liagora
Species	viscida
Common name	Not known



**Description:** It is a bushy lagoon. Thallus is calcified and formed of very fine cylindrical filaments, about 1 mm in diameter, with strong dichotomous branch (which separate in two). The consistency is firm but remains flexible. The base of attachment of the substratum is discoidal. It reaches 5-10 cm in height. The color is white. The ends are devoid of limestone are pink to purplish, but never red.

**Abundance:** *Liagora viscida* is visible in the spring and especially in summer.

**Uses & Compounds:** Not known.





#### 48. *Lithophyllum kotschyanum* Unger, 1858

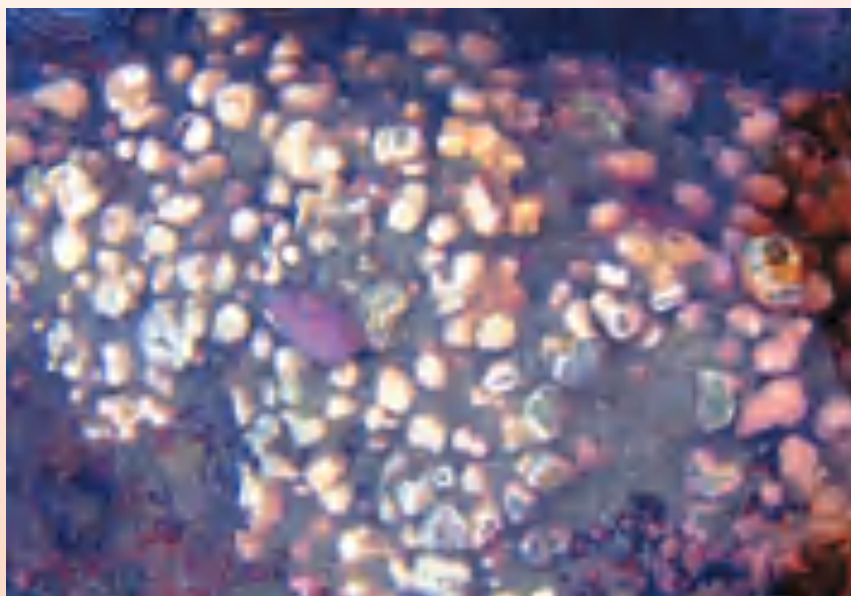
Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Corallinales
Family	Lithophyllaceae
Genus	Lithophyllum
Species	kotschyanum
Common name	Not known



Description: Thallus a crust with thick stubby branches that contain thick medullary hypothallus and moderately to well-developed marginal perithallus. Medullary hypothallus built of curved layers of rectangular cells; considerable range in cell size both in different layers and in same layer from center to edge. Marginal perithallus of well-defined cell layers. Conceptacles rather flattened on top with large central aperture.

Abundance: Fossil sediment.

Uses & Compounds: Not known





#### 49. *Lithophyllum okamurae* Foslie, 1900

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Corallinales
Family	Lithophyllaceae
Genus	Lithophyllum
Species	okamurae
Common name	Not known



**Description:** Thallus as heavily calcified thick crusts, tightly attached to the substratum, with age forming heads (4-8 cm diameter) covered with short knobs (3-5 mm high, 1.5-3 mm diameter). Knobs simple, sometimes divided or occasionally anastomosing, with obtuse tops. In longitudinal section of knob, cells 12-20  $\mu$ m long and 7-10  $\mu$ m broad. Color violet-red or pale-pink.

**Abundance:** Growing in the low intertidal and sub tidal zones, on stones, boulders, dead corals and seashells in semi sheltered and open areas.

**Uses & Compounds:** Not known.







## 50. *Lithothamnion glaciale* Kjellman, 1883

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Corallinales
Family	Lithophyllaceae
Genus	Lithophyllum
Species	glaciale
Common name	Not known



**Description:** It starts of as a deep pink crust on a hard substrate. After a while small excrescences start to grow, and eventually become nodules or branched structures. Loose noodles are often found on the seabed in the sub tidal zone, where they continue to grow, even if they are continuously grinded by the movements caused by current or waves. They have thinner (2-3 mm), more fragile branches. Bright pink to purplish in color.

**Abundance:** Fossil sediment.

**Uses & Compounds:** Not known.





### 51. *Nemalion helminthoides* (Velley) Batters, 1902

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Nemaliaceae
Genus	Nemalion
Species	helminthoides
Common name	Threadweed
	Sea Noodles



**Description:** Growing from a small basal disc to a length of 10 to 20 cms. Generally branching only a few times. Very mucilaginous in texture. Cylindrical, softly gelatinous thallus, simple or sparingly dichotomously branched, to 2 mm wide, with discoid base. Reddish to purple brown in color.

**Abundance:** Abundant on exposed rocky shores, generally growing on mussels (above) barnacles and limpets in the lower intertidal.

**Uses & Compounds:** Not known.





## 52. *Palmaria palmata* (Linnaeus) F. Weber & D. Mohr, 1805

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Palmariales
Family	Palmariaceae
Genus	Palmaria
Species	palmata
Common name	Water leaf, Sheep dulse



**Description:** The blades are flattened and broad with numerous forks. Lobed segments make the plant appear hard-shaped. It has a tiny, disc-shaped holdfast and widens almost immediately into tough, leathery fronds. Deep rose to reddish purple in color.

**Abundance:** This is common red alga growing near or below the low tide mark in somewhat protected base with strong tidal currents. It grows best on long sloppy edges.

**Uses & Compounds:** It is used in cooking: dulse's properties are similar to those of a flavor-enhancer. Fresh dulse can be eaten directly off the rocks before sun-drying. Sun-dried dulse is eaten as is or is ground to flakes or a powder. It can be used in soups, chowders, sandwiches, and salads, or added to bread or pizza dough. Rich in vitamins and micronutrients.

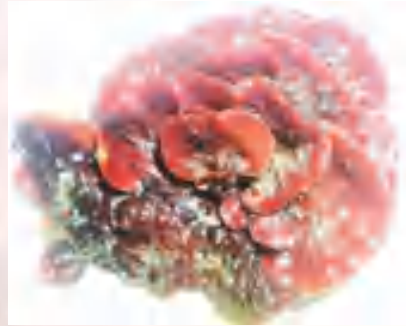






### 53. *Peyssonnelia polymorpha* (Zanardini) F. Schmitz in Falkenberg, 1879

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Peyssonneliales
Family	Peyssonneliaceae
Genus	<i>Peyssonnelia</i>
Species	<i>polymorpha</i>
Common name	Not known



**Description:** The algal surface shines and often sports parallel lines at a distance from one another, and rounded lines more densely packed. The rounded lines delineate accelerated growth years, as in the rings in higher plants. The straight lines are light, multicellular rhizoids that develop on the algal underside. The alga is bright crimson red in color.

**Abundance:** The alga grows in the sub tidal zone and is never exposed during low tide. It can be found in niches and places where the light level is low. In particularly shaded habitats, such as marine caves, the alga may be found in shallower water, near the tidal level.

**Uses & Compounds:** Not known.





#### 54. *Peyssonnelia squamaria* (S.G. Gmelin) Decaisne ex J. Agardh, 1842

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Peyssonneliales
Family	Peyssonneliaceae
Genus	Peyssonnelia
Species	squamaria
Common name	Not known



**Description:** The *Peyssonnelia squamaria* is formed by flat, round and irregular scales. Several scales sometimes emerge from a common holdfast and cover one another. The algal surface shines and often sports parallel lines at a distance from one another, and rounded lines more densely packed. The rounded lines delineate accelerated growth years, as in the rings in higher plants. The straight lines are light, multicellular rhizoids that develop on the algal underside. The rhizoids assist the alga in clinging to a substrate, and they also provide the ringed lines with a lighter color. The scales' diameter changes, but is usually 2-3 cm in diameter. The alga is bright crimson red in color. Some individuals may tend towards orange.

**Abundance:** It can be found in niches and places where the light level is low. In particularly shaded habitats, such as marine caves, the alga may be found in shallower water, near the tidal level. *P. squamaria* have been found by Edelstein at 80 m depth upon a rocky substrate.

**Uses & Compounds:** Not known.





### 55. *Porphyra indica* V. Krishnamurthy & M. Baluswami, 1984

Taxonomy □ Chlorophyta

Class □ □ Bangiophyceae

Order □ □ Bangiales

Family □ □ Bangiaceae

Genus □ □ Porphyra

Species □ □ indica

Common name □ Laver



**Description:** Plants attached to the substrates by rhizomes. Thallus with smooth margin without any spin lose processes. Plants 18 cm high and up to 11 cm broad through its broadest portion. Thallus reddish pink in color.

**Abundance:** It is found growing attached to rocks and shells at high tide level. This species occurs seasonally during January to June/August.

**Uses & Compounds:** It is used as snacks, salads or added to soups and various oriental dishes.







## 56. *Porphyra vietnamensis* Tak.Tanaka & Pham-Hoàng Ho, 1962

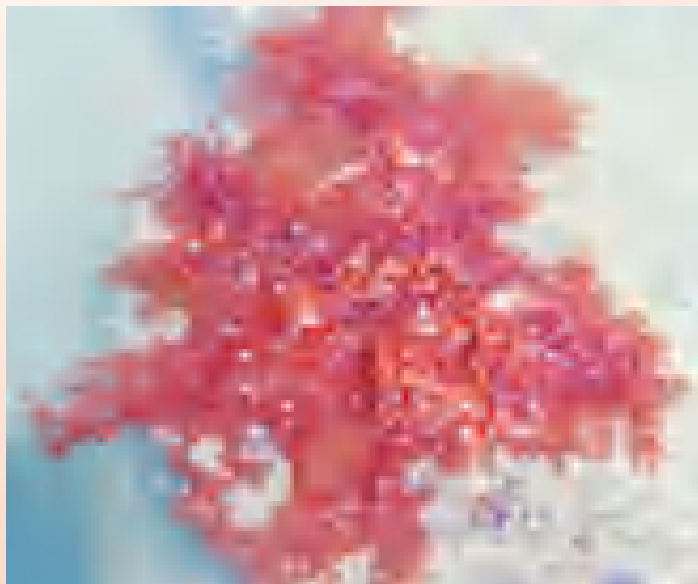
Taxonomy	Chlorophyta
Class	Bangiophyceae
Order	Bangiiales
Family	Bangiaceae
Genus	Porphyra
Species	vietnamensis
Common name	Limu Pahe'e



Description: Thallus is membranous, margin shows undulate, edge dentate and many blade lets developed from the common base. Thallus attached to the substratum with the help of rhizoid like structure. Blades monochromatic. Vegetative cells with a stellate chromatophore, rhizoidal cells oblong-ovate. Purple or pinkish purple

Abundance: Growing on upper intertidal rocks

Uses & Compounds: Used as food, animal feed etc.





### 57. *Scinaia complanata* (Collins) A.D.Cotton, 1907

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Nemaliales

Family □ Scinaiaceae

Genus □ *Scinaia*

Species □ *complanata*

Common name □ Not known



**Description:** Thallus erect, terete to slightly compressed, sub dichotomously branched, multi-axial. With a medullary core of numerous, slender, branched filaments usually less than 20% of the thallus diameter in width, producing numerous radiating, branched filaments forming an outer medulla and a cortex 2-4 cells broad, with an outer layer of large, colorless, utricles, with or without rhodoplastic ovoid cells between them. Tetrasporophyte minute, filamentous, branched; unknown in other species. Red to reddish pink in color.

**Abundance:** It grows to depths of 18 m attached by a single holdfast to limestone or hard bottom habitat, on rocky substratum.

**Uses & Compounds:** Not known.





### 58. *Solieria robusta* (Greville) Kylin, 1932

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Gigartinales
Family	Solieriaceae
Genus	Solieria
Species	robusta
Common name	Not known



**Description:** Plant erect, moderately and irregularly branched at intervals of 1-4 cm. Branches are relatively soft, terete to slightly compressed, basally constricted and tapering above to rounded or sub-acute tips. Holdfast fibrous, branched, 1-2 cm across, with several fronds; epilithic. Structure multiaxial, with 5-15 apical cells. Rhodoplasts elongate to ribbon shaped, several per cells. Color grey-red to brown-red, often bleached to yellow-grey.

**Abundance:** Found in a variety of depths and wave energies.

**Uses & Compounds:** Source of carrageenan.







### 59. *Spermothamnion repens* (Dillwyn) Magnus, 1873

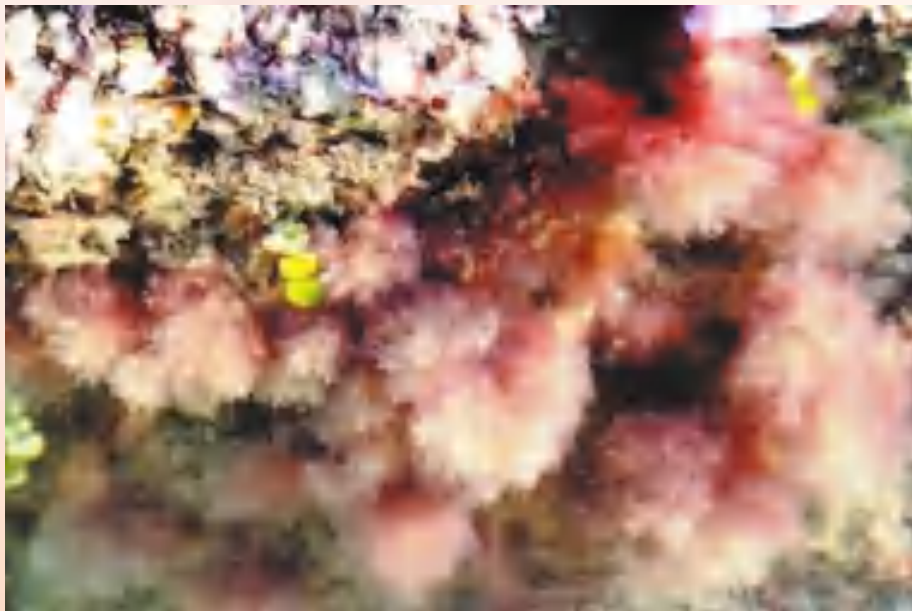
Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Ceramiales
Family	Wrangeliaceae
Genus	Spermothamnion
Species	repens
Common name	Not known



Description: Thin wiry filaments form dense tufts. Attached to rocks. 5 to 10 cm across. Pinkish-red to red-brown in color. IUCN red listed alga.

Abundance: On sand-covered rocks; usually epiphytic; low to mid intertidal in sites from sheltered to extremely wave-exposed.

Uses & Compounds: Not known.





**60. Titanophycus validus (Harvey) Huisman, G.W. Saunders & A.R. Sherwood 2006**

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Liagoraceae
Genus	Titanophycus
Species	validus
Common name	Not known



**Description:** Thallus with stiff lower parts, soft upper parts, fleshy. Branching dichotomous throughout; calcification heavy below, moderate above. Branches to 1.3 mm diameter; apices tapering to 0.8 mm diameter. Medullary filaments longitudinal, cells 10-20 diameters long, cylindrical to slightly swollen. Cortical filaments radial, cylindrical, 4-5 times dichotomously branched; 10 cm high. Chalk-white below, pink-white above, peppered with dark red dots when reproductive, apices red-brown.

**Abundance:** Generally found growing on rock or coral at depths ranging from intertidal pools to 15 m.

**Uses & Compounds:** Not known.





**61. Tolypiocladia glomerulata (C. Agardh) F. Schmitz in F.Schmitz & Falkenberg, 1897**

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Ceramiales
Family	Rhodomelaceae
Genus	Tolypiocladia
Species	glomerulata
Common name	Not known



**Description:** Filamentous red that forms loose mats from 0.3-1 cm thick. Main branches are 0.5 mm in diameter with many smaller branches growing out from them. Has distinctive tree like branching pattern. Forms mats 2-5 cm wide.

**Abundance:** On rubble and coral heads in sub tidal habitats. In deeper water it is dark red and in shallow water it appears pale red.

**Uses & Compounds:** T. glomerulata are rich in protein content, vitamins and macro mineral contents, which concluded that the red seaweed. It can be used as food supplements to improve the nutritional value for the human diet and animal feed.







**62. *Tricleocarpa cylindrica* (J. Ellis & Solander) Huisman & Borowitzka, 1990**

Taxonomy	Chlorophyta
Class	Florideophyceae
Order	Nemaliales
Family	Galaxauraceae
Genus	<i>Tricleocarpa</i>
Species	<i>cylindrica</i>
Common name	Not known



**Description:** Thallus sub dichotomously branched every 0.3-2.5 cm, branches terete, glabrous, 0.5-1.5 mm broad, occasionally regularly jointed. Holdfast discoid, 1-3 mm across; epilithic. structure of a medulla of longitudinal filaments giving rise to radiating, dichotomously branched filaments that form the cortex of 3-4 layers of inflated cells, somewhat longer than broad. Rhodoplasts campanulate with a central pyrenoid. Calcification present in the cortex. Pale red to grey-red in color.

**Abundance:** Commonly found in tropical and subtropical seas. Usually on rocks thinly covered with sand, at depths ranging from intertidal rock pools to 15 m.

**Uses & Compounds:** Not known.





### 63. *Tricleocarpa fragilis* (Linnaeus) Huisman & R.A. Townsend, 1993

Taxonomy □ Chlorophyta

Class □ Florideophyceae

Order □ Nemaliales

Family □ Galaxauraceae

Genus □ *Tricleocarpa*

Species □ *fragilis*

Common name □ Not known



**Description:** Thallus forming erect, bushy, composed of slightly calcified, terete branches. Branches regularly dichotomous and divaricately branched, forming acute angles; interdichotomal segments glabrous, cylindrical, slightly constricted and rounded at both ends, with annulated surfaces. Cortex with 3-4 layers, innermost one inflated, colorless, grading to smaller, pigmented outer cortical cells; thallus internally composed of medulla of longitudinal filaments. Tetrasporophytes probably small, filamentous, branched. Gametophytes monoecious or dioecious. Pale pink to grey in color.

**Abundance:** *T. fragilis* is commonly found attached to rocks, dead corals and shells in shallow areas, moderately exposed to wave action, where it forms large solitary clumps. Material of this alga has been dredged up in sub tidal areas more than 50 m deep.

**Uses & Compounds:** It is mainly used in animal feed and as a fertilizer in leached acid soils.

