

NATIONAL INSTITUTE OF OCEANOGRAPHY

DONA PAULA-403 004, GOA



**LIST OF MARINE ALGAE
FROM INDIA**

JANUARY, 1983

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A. G. UNTAWALE, V. K. DHARGALKAR & V. V. AGADI

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FOREWORD

Recently, the Department of Ocean Development, the Council of Scientific & Industrial Research and various other organizations and institutes in the country, have identified seaweeds as one of the important research areas where more inputs are necessary. Utilisation of this natural marine living resource has not received much attention in some of the south east Asian countries so far, in spite of various efforts in the past.

Keeping in view, the economic importance of the seaweeds, the National Institute of Oceanography, Dona Paula, has been working on various applied aspects, such as resource evaluation, cultivation and utilisation.

A systematic research on seaweeds requires correct and upto date information on the various resources. This revised list on 'Marine Algae from India' is the result of an effort by Dr. A.G. Untawale, Dr. V.K. Dhargalkar and Sri. V.V. Agadi of the Biological Oceanography Division of our Institute, to update the information on seaweeds.

I hope that this revised list will be of great use and help to the students and researchers in the area of marine algae.

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INTRODUCTION

Marine algae form one of the major resources of the Ocean. There are about 20,000 marine algal species distributed throughout the world. The total marine algal harvestable crop of the world has been estimated to be 1,72,10,000 tons. Japan, Korea, Mexico and Canada are the countries which contribute maximum to this economical important marine resource.

India with its vast coastline and group of islands also harbours several marine algal species. Indian coastline has been explored by several marine algologists since 19th century. So far about 624 marine algal species have been reported from Indian coast. The total marine algal crop from Indian coast is estimated to 70,000 tons per annum. In spite of the earlier efforts the Indian coastline has not been studied in detail. Areas like Andaman, Nicobar, as well as Lakshadweep Islands, Karnataka, Kerala, Orissa and West Bengal coast have not been explored for these resources.

In the past, efforts have been made by Biswas (1945), Biswas and Sharma (1950) Dixit (1965, 68), Srinivasan (1965) and Chaugule and Gunale (1981) to prepare a list of marine algae recorded from different parts of the Indian coast. Dixit (1965, 68) listed about 411 marine algal species. Krishnamurthy and Joshi (1970), prepared a 'Checklist of Indian Marine Algae' wherein about 520 species have been recorded.

After a gap of about 12 years it was found necessary to again review the position, in view of more extensive research activities in the field of marine algae in India. The present work reports 624 marine algal species belonging to various groups. Distribution of these species along the maritime states of India has also been indicated. So during the last 12 years about 104 new marine algal species have been included to this flora of India. Many more will be added to this list in near future. Some of the marine algal species might have been missed by oversight.

It is hoped that this enumeration of Indian marine algal species would be useful to the algologists in general and students in particular to give information at a glance about our marine wealth.

YEARWISE REPORTS OF INDIAN MARINE ALGAE

<u>DURATION</u>	<u>Author - (YEAR)</u>
1820 - 1829	: C.A. Agardh (1822, 23), J. Agardh (1924), Bory (1929)
1830 - 1839	: Greville (1930), Bory (1836), Boergesen (1837)
1840 - 1849	: Kuetzing (1848,49), J. Agardh (1848,49) Greville (1848, 49)
1850 - 1859	: Greville (1850), Agardh (1951)
1860 - 1869	: De Toni (1863, 64)
1870 - 1879	: Gruenow (1870), Martens (1870, 71), J. Agardh (1872, 76).
1880 - 1889	: Hauck (1884), Dickie (1887), Gruenow (1888), De Toni (1889)
1890 - 1899	: De Toni (1895), Agardh (1895), Schimitz (1897)
1900 - 1909	: Schmidle (1900), J. Agardh (1901), Barton (1903), Howe (1904), Foslie (1904).
1910 - 1919	: A. & E.S. Gepp (1911), Zeh (1912), Weber Van Bosse (1913), Gruenow (1915, 16).
1920 - 1929	:
1930 - 1939	: Boergesen (1931,32,33, 34, 35, 37, 38, 40, 47), Kyllin (1931, 33), Iyengar (1938).
1940 - 1941	: Dixit (1940), Iyengar & Ramnathan (1940, 41), Iyengar (1940), Balakrishnan (1946), Srinivasan (1946).
1950 - 1959	: Sraeramalu (1952), Krishnamurthy (1954, 57) Iyengar and Ramnathan (1954), Chacko et al (1955), Desikachary (1957, 58), Desikachary and Balakrishnan (1957), Balakrishnan (1959), Verma (1959), Srinivasan (1959), Hillis (1959), Thivy (1959).
1960 - 1969	: Varma (1960), Krishnamurthy (1960, 66), Srinivasan (1960, 62), Balakrishnan (1961), Ganesan (1962), Rao (1962), Thivy and Iyengar (1963), Dawson (1963), Thivy and Chauhan (1963), Thivy and Rao (1963), Chauhan and Thivy (1964), Dixit (1964, 67, 68), Chauhan (1964), Umamaheswara Rao and Sraeramalu (1965), Shah and Vaidya (1965), Post (1965), Ganesan (1965), Rao (1965), Desikachari and Ganesan (1966), Thivy and Doshi (1966), Misra (1966), Taylor (1966), Thivy and Visalakshmi (1963, 66), Mairh (1967), Ganesan (1967), Kale (1967), Rao and Kale (1969), Krishnamurthy and Joshi (1969).

- 1970 - 1979 : Patel and Francis (1970), Joshi and Krishnamurthy (1972), Balakrishnan et al (1974), Umamaheswara Rao (1974), Krishnamurthy (1978), Patel and Izabella (1978).
- 1980 - 1989 : Untawale et al (1980), Untawale et al. (1980), Untawale and Agadi (1981), Chaugule and Gunale (1981), Balakrishnan and Kinkar (1981).

Table - Showing number of Orders, families, genera and species of marine algae belonging to the different group along the Indian coast line. •

	Chlorophyta	Phaeophyta	Rhodophyta	Cyanophyta	Total
Order	4	5	6	2	17
Families	15	12	31	6	64
Genera	45	39	120	11	215
Species	159	141	307	17	624

SEAWEED RESOURCES ALONG THE INDIAN COAST

Sr. No.	Area	Annual yield tons/Year (fresh wt)	Author (s)
1.	<u>GUJARAT</u>		
	(a) Gulf of Kutch	100,000	Desai (1967)
	" " "	19,000	Chauhan & Krishnamurthy (1968)
	(b) Hanumandandi-to-Vumani (Okha)	650	Bhanderi & Trivedi (1975)
	(c) Adatra Reef, Okha, Dera, Narora, Sika, Karumbhar and Baida in Gulf of Kutch	18,760	Sreenivasa Rao <u>et al</u> (1964)
	(d) Saurashtra Coast	282 to 608	Chauhan & Mairith (1978)
2.	<u>MAHARASHTRA</u>		
	(a) Konkan	315	Chauhan (1978)
	(b) Entire coast	20,000	Untawale <u>et al</u> (1979)
3.	<u>GOA</u>	255 2,000	Untawale & Dhargalkar (1975) Dhargalkar (1981)
4.	<u>KARNATAKA</u>		
	(a) Entire coast	Negligible	Untawale & Agadi (1981)
5.	<u>KERALA</u>	?	- -
6.	<u>TAMIL NADU</u>		
	(a) Cape Comorin-to-Colachel	5	Koshy & John (1948)
	(b) Calimare-to-Cape-Comorin	66,000	Chacko & Malu Pillei (1958)
	(c) Pamban	1,000	Verma & Rao (1964)
	(d) Palk Bay	1,040	Umamaheswara Rao (1965)
		900	" " (1968)
	(e) South East Coast	20,535	Subbaramaiah <u>et al</u> (1977)
	(f) Entire Coast	22,044	Subbaramaiah <u>et al</u> (1979)
7.	<u>ANDHRA PRADESH</u>	?	- -
8.	<u>ORISSA</u>		
	(a) Chilka Lake	5	Mitra (1946)
9.	<u>WEST BENGAL</u>	?	- -
10.	<u>ANDAMAN & NICOBAR ISLAND</u>	?	---
11.	<u>LAKSHADWEEP ISLANDS</u>	3,645 to 7,598	Subbaramaiah <u>et al</u> (1979)

CHLOROPHYTA

ADDENDUM

S.No. Classification Guj. Mah. Goa Kar. Ker. Lacc. T.N. Nad. Oris. W.Ben. And.

Division:- Chlorophyta

Order:- Cladophorales

Family:- Cladophoraceae

1. Rhizoclonium tortuosum +
Kuetz

Order:- Ulotrichales

Family:-Chaetophoraceae

2. Ulvella lens Crouan +

Order :- Siphonocladales

Family:- Caulerpacae

3. Bryopsis indica A. & E.S.
'Gepp +

4. Caulerpa lentillifera +

5. C. chemnitzia +

Family:- Dasycladaceae

6. Acetabularia parvule +
Solms Laubach

Family:- Codiaceae

7. Udotea conglutinata +
(Ellis and Slonder) Lamour

8. U. iyengarii +

Family:- Valoniaceae

9. Boodlea siemensis Reinb. +

Order:- Codiiales

Family:-Protosiphonaceae

10. Hyllocystis indica Patel +
and Isabella

Order :- Heterosiphonales

Family:- Vaucheriaceae

11. Vaucheria longicaulis +
'Gepp

PHAEOPHYTA

S.No. Classification and name Guj.Mah. Goa Kar Ker Lacc Tam And Oris Beng A & N.

I.	Order: Ectocarpales			
a.	Family: Ectocarpaceae			
1.	Bachelotia antillarum (Gruehow) Gerloff	+	+	+
2.	Streblonema turmale, Boerg	+	+	+
3.	Ectocarpus arabicus (Fig of De Not)	+	+	
4.	E. batfersii, Bornet	+		
5.	E. breviarticulatus, J. Agar	+	+	+
6.	E. columellaris, (Heydrich)	+		
7.	E. elachistaeformis (Heydrich)	+		
8.	E. indicus, Sonder	+		
9.	E. ovalis, Kjellm.	+		
10.	E. rhodocortonoides, Boerg	+		
11.	E. simpliciusculus, Ag	+	+	
12.	E. coniger, Boerg.	+	+	+
13.	E. siliculosus	+	+	+
14.	Giffordia confifera, (Boerg) Tayl.	+	+	+
15.	G. ovata	+		
16.	G. mitchellae, (Harv.) Ham.	+	+	+
17.	G. sandriana (Zan.) Ham.	+		

S.No. Classification and name Guj. Mah. Goa Kar.Ker.Lacc.Tam And Oris Beng A & N.

18.	G. regularis	+	+	+	+
19.	Feldmannia irregularis (Kuetz) Ham.	+	+		+
20.	F. filifer		+	+	+
21.	F. brevikrliculatus		+	+	+
22.	Hamelletta dermonematis, Boerg.		+		+
23.	H. geminifructus, Boerg				+
24.	Myriogloea sciurus	+			
II.	Order: Chordariales				
b.	Fam. Ralfsiaceae				
25.	Ralfsia seylanica, Harve		+		
26.	R. verrucosa, (Arech) C.Ag.		+	+	
27.	R. expansa		+		
C.	Family: Sphacelariaceae				
28a.	Sphacelaria furcegera Kuetz	+	+	+	+
28b.	S. tribuloides, Mene	+			+
d.	Family: Myrionemataceae				
29.	Hectonema saragassicola, Boerg.				+
30.	H. terminalis (Kuetz.) Kulin	+	+	+	+
31.	H. enhalis	+	+	+	+

S.No. Classification and name Guj. Mah Goa Kar. Ker M. Lacc Tam And Oris Beng A & N

32.	H. colimularis	+	+	+
33.	Myrionema strangulans, (Greville)	+		
34.	Myrionema sp.			+
35.	Componema gracile (Kuck)	+		
36.	Ascocyclus orbicularis (J. Ag) Magnus.	+		
37.	Kueteziella battersii	+	+	
38.	K. elachistaeformis	+	+	
e.	Family: Carynophiacaceae			
39.	Myriactula arabica (Kuets) Feld.	+		
40.	M. Pulvinata Kuetz.	+		
f.	Family: Chordariaceae			
41.	Levringia boergensenii, Kyllin.	+		+
42.	Liebmannia laccadivarum (Bart.)		+	
g.	Family: Spermatochnaceae			
43.	Namacystus decipiens (Sond) Kuck.	+		
III.	Order: Scytosiphonales			
h.	Family: Scytosiphonaceae			
44.	Hydroclathrus clathratus (C. Ag)	+		
45.	Colpomenia sinuosa (Derb et Sol)	+	+	+

ADDENDUM

S.No.	Classification	Guj. Mah. Goa Kar. Ker. Lacc. Tam. And. Oris. W.Ben. Assm
	Division:- Phaeophyta	
	Order :- Ectocarpales	
	Family :- Ectocarpaceae	
1.	Feldmania indica (sonder) Womersly et Baily	+
2.	Protoectocarpus speciosus (Boerg.) Kuchuck	+
3.	Giffordia duchassaigiana (Grunow) Taylor	+
4.	Pilayella littoralis (Lin.) Kjell	+
	Order :- Chordariales	
	Family:- Corynophlaeaceae	
5.	Leathesia sp. Gray	+
	Family:- Myrionemataceae	
6.	Hectonema columellaries (Boerg.) Comb. nov.	+
	Order :- Dictyotales	
	Family:- Dictyotaceae	
7.	Dictyota cliata J. Ag.	+
8.	D. cervicornis Kuetz	+
9.	Dilophus alternans J. Ag.	+
10.	Order:- Fucales	
	Family:-Sargassaceae	
10.	Sargassum barberifolium J.Ag.	+
11.	S. laminifolium	+

RHODOPHYTA

S.No. Classification and name Guj. Mah. Goa Kar Ker. Lacc.Tam. And.Oris. Beng. A & N

I.	Division: Rhodophyta								
a.	Order: Goniotrichales								
1.	Family: Goniotrichaceae								
	Bangiopsis dumontioides (Gruan Krish)								+
2.	B. subsimplex, Mont.Schm.								+
3.	Goniotrichum elegans, (Chauv) Le Jolis	+							
b.	Family: Bangiaceae								
4.	Porphyra vietnamensis, Tan. et Ho.		+	+	+				+
c.	Family: Erythropeltidaceae								
5.	Erythrocladia irregularis, Rosen.								+
6.	E. subintegra, Rosen.								+
7.	Erythrotrichia carnes,J.Ag.			+					+
8.	E. obscura								+
II.	Order: Nematinales								
d.	Family: Acrochaetiaceae								
9.	Acrochaetium canarense, Boergs.								+
10.	A. carnea, J. Ag.								
11.	A. crissipes, Boergs.	+							
12.	A. dwarkense, Boergs.	+							
13.	A. erectum, Boergs.								
14.	A. gracile, Boergs.								
15.	A. krusadii, Boergs.								+
16.	A. iyengarii, Boergs.								+
17.	A. liagoraefilum, Boergs								+
18.	A. liagoroides, Boergs.								+
19.	A. multisporum, Boergs								+
20.	A. robustum, Boergs								+

S.No. Classification and name Guj. Mah. Goa Kar Ker Lacc.Tam. And.Oris. Beng. A& N

III. Order: Cryptonemiales

61. Family: Rhizophyllidaceae

62. Chondrococcus hornemanii (Mert)

63. Family: Peyssoneliaceae

64. Peyssonella obscura Web v.Bosse.

65. P. conchicola

66. Cruoriella bicolar, Boerg.

67. Family: Hildenbrandtiaceae

68. Hildenbrandtia prototypus, Nardo.

69. Family: Corallinaceae

70. Amphiroa anastromosans, W.v. Basse.

71. A. anceps (Lamk.) Decsne

72. A. foliacea Lamour

73. A. fragillissima (L.) Lamour

74. Arthrocardia capensis (Leach)

75. Cheilosporum spectabile, Harvey

76. Dermatolithon ascripticum (Foslie) Setch et Mason

77. D. pustulatum (Lamour) Foslie.

78. Goniolithon laccadivicum, Foslie.

79. Hydrolithon iyengarii, Desik et Gan.

80. H. reinboldii, W.v.Bosse

S.No. Classification and name Guj. Mah. Goa Kar.Ker Lacc. Tam. And.Oris. Beng. A & N

t.	Family: Sphaerococaceae					
150.	Caulacanthus ustulatus (Mert) Kurtz.	+				
u.	Family: Sarcodiaceae					+
151.	Sarcodia ceylanica, Harvey					
v.	Family: Rhabdoniaceae					
152.	Catenella repens (Lightf.) Batt.	+	+	+		
153.	C. impudica (Mont.) J.Ag.	+				
w.	Family: Rhodophyllidaceae					+
154.	Calliblepharis jubata (Good et Woodw) Kurtz.					
x.	Family: Phylloporaceae					+
155.	Gymnogongrus pygmaeus (Grev.) J.Ag.					
y.	Family: Gigartinaceae					+
156.	Gigartina acicularis (Wulfen) Lamour.	+				
v.	Order: Rhodymeniales					
z.	Family: Rhodymeniaceae					+
157.	Botryocladia leptopoda (J.Ag.) Kylin					
158.	B. skottsbergii (Boerges) Icivr.				+	
159.	Coelarthrum opuntia (J. Ag.) Boerg.					+
160.	Marypelta thivyae, Dawson				+	
161.	Rhodymenia austialis, Sonder				+	
162.	Palmaria palmata				+	
163.	P. dissecta					+

ADDENDUM

S.No. Classification Guj. Mah. Goa Kar. Ker. Lacc. Tam. And. Oris. W. Beng. And. & Nic.

Division:- Rhodophyta

Order:- Nemalionales

Family:- Acrochaetiaceae

1. Acrochaetium flexuosum vickers +

2. Kylinia sargassicola (Boerg.) Comb. nov. +

3. K. spathoglossum (Boerg.) Comb. nov. +

Family:- Helminthocladaceae

4. Liagora distenta (Mertens) J. Ag. +

Family:- Gelidiellaceae

5. Gelidiella indica P.S. Rao. +

Order:- Cryptonemiales

Family:- Corallinaceae

6. Jania capillacea +

7. Lithothamnion erubescens Foslie +

8. L. prolifera +

9. Helymenia polyductila (Boerg.) +

Order:- Gigartinales

Family:- Solieriaceae

10. Solieria indica +

11. Sarconema scinaoides (Boerg.) +

Family:- Gracilariaceae

12. Gracilaria dura +

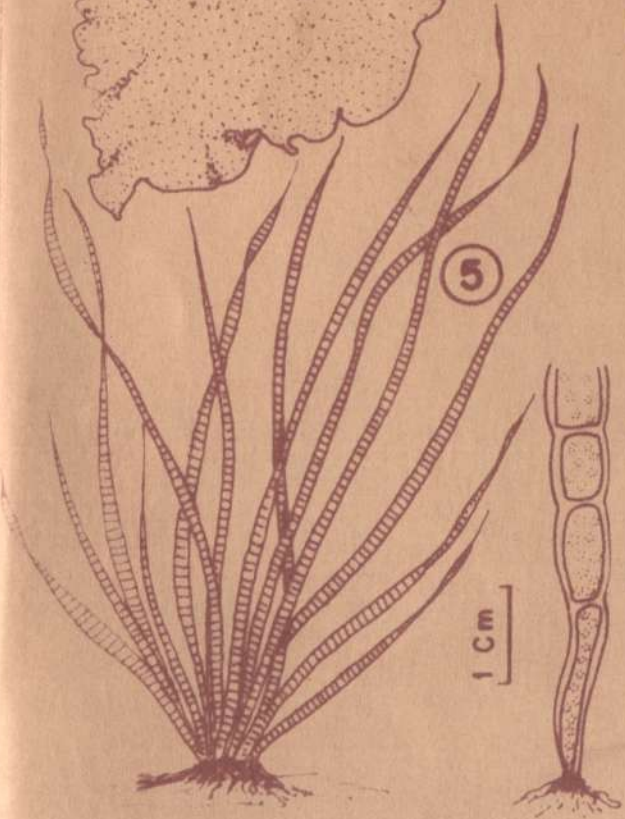
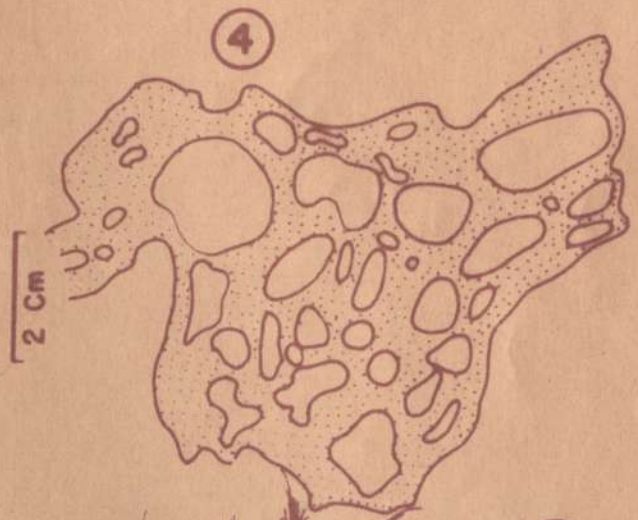
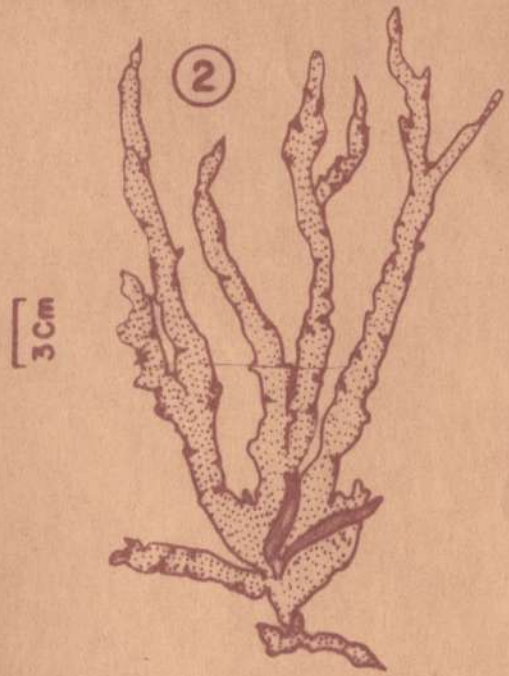
13. G. arcuata. zan. var. attenuata Rao +

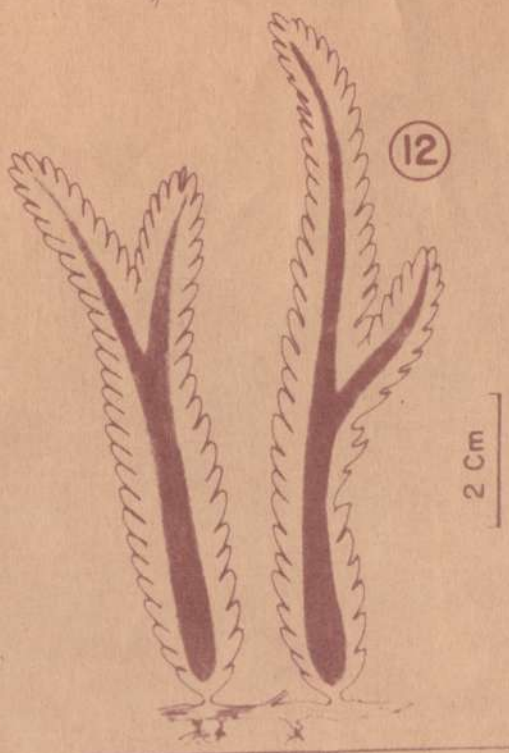
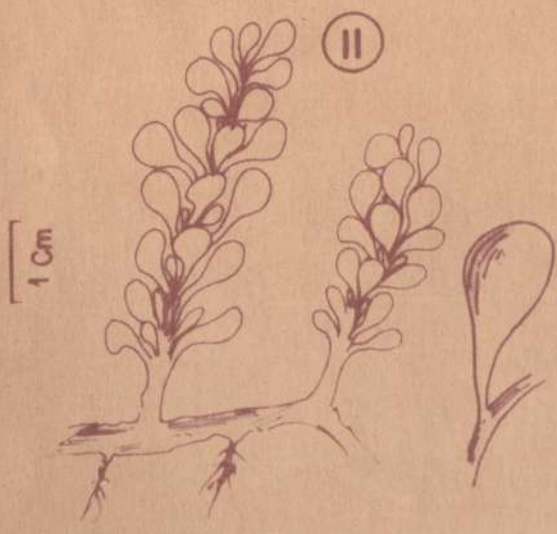
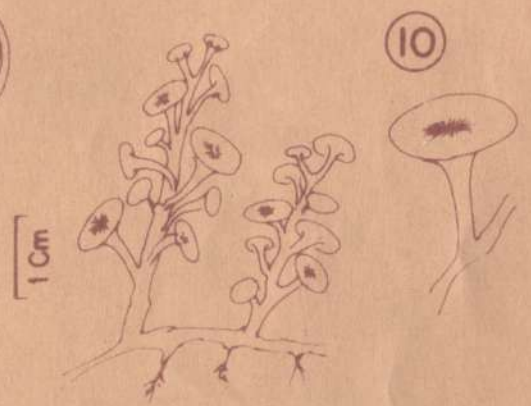
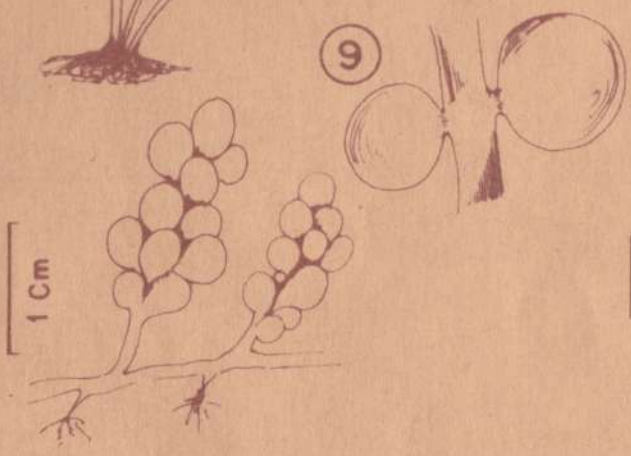
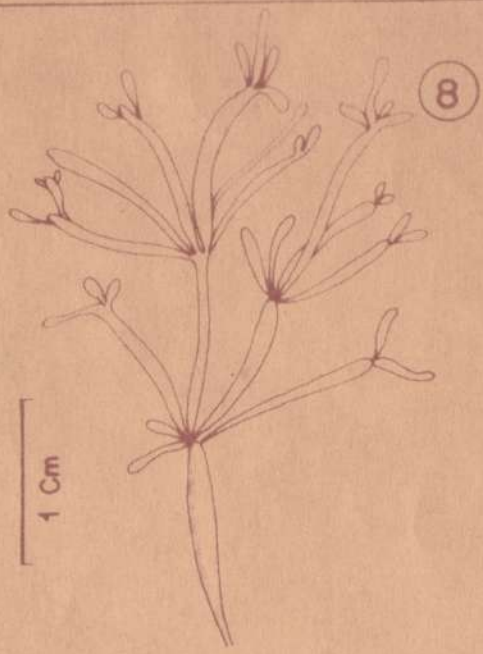
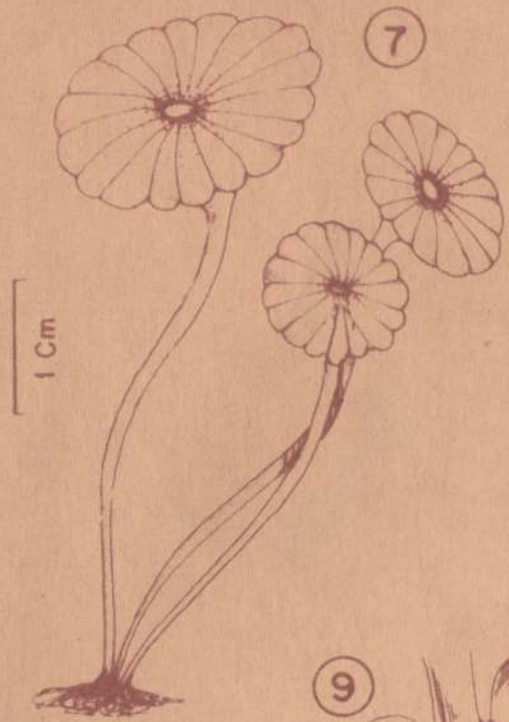
CYANOPHYTA

LEGENDS FOR PLATES

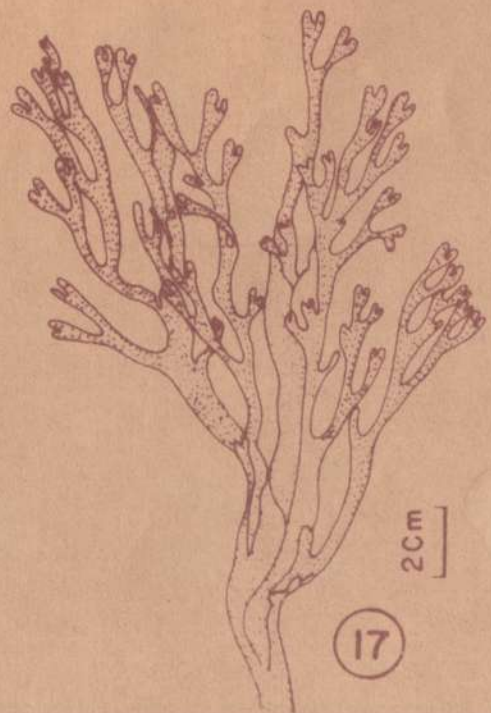
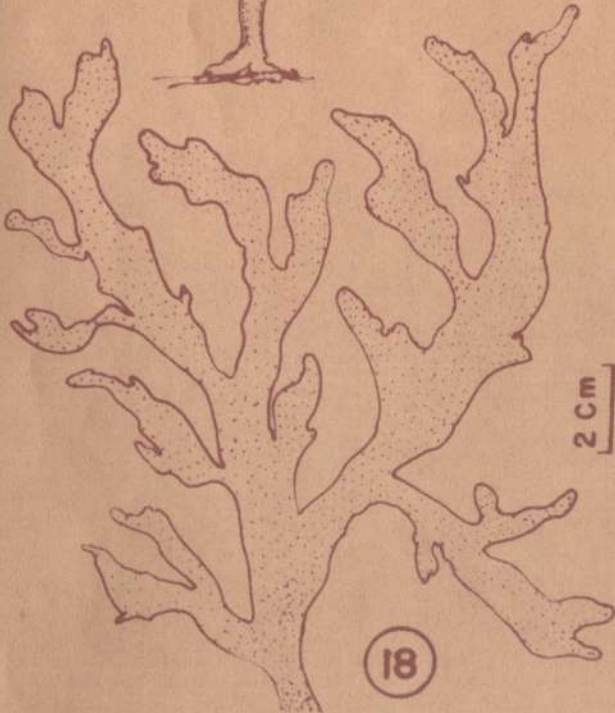
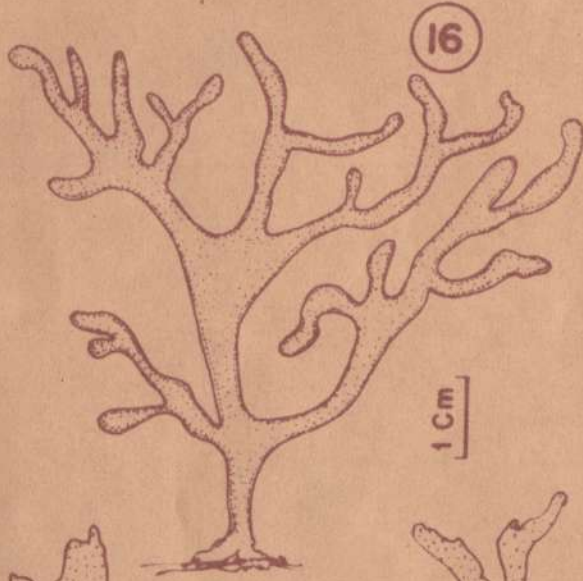
1. Enteromorpha flexuosa
2. Ulva fasciata
3. Ulva lactuca
4. Ulva reticulata
5. Chaetomorpha media
6. Bryopsis hypnoides
7. Acetabularia sp.
8. Ernodesmis verticillata
9. Caulerpa microphysa
10. Caulerpa peltata
11. Caulerpa racemosa var. Chemnitzia
12. Caulerpa scalpelliformis
13. Caulerpa taxifolia
14. Caulerpa sertularioides
15. Caulerpa verticillata
16. Codium indicum
17. Dictyota dichotoma
18. Dictyota dumosa
19. Spatoglossum asperum
20. Dictyopteris australis
21. Pocockiella variegata
22. Padina tetrastrumatica
23. Stoechospermum marginatum
24. Sargassum piluliferum
25. Sargassum cinereum
26. Sargassum ilicifolium
27. Sargassum wightii
28. Gelidium pusillum
29. Halymenia porphyroides
30. Grateloupia lithophila
31. Gracilaria corticata
32. Hypnea musciformis
33. Hypnea cervicornis
34. Martensia fragilis
35. Acanthophora spicifera
36. Laurencia papillosa

PLATE

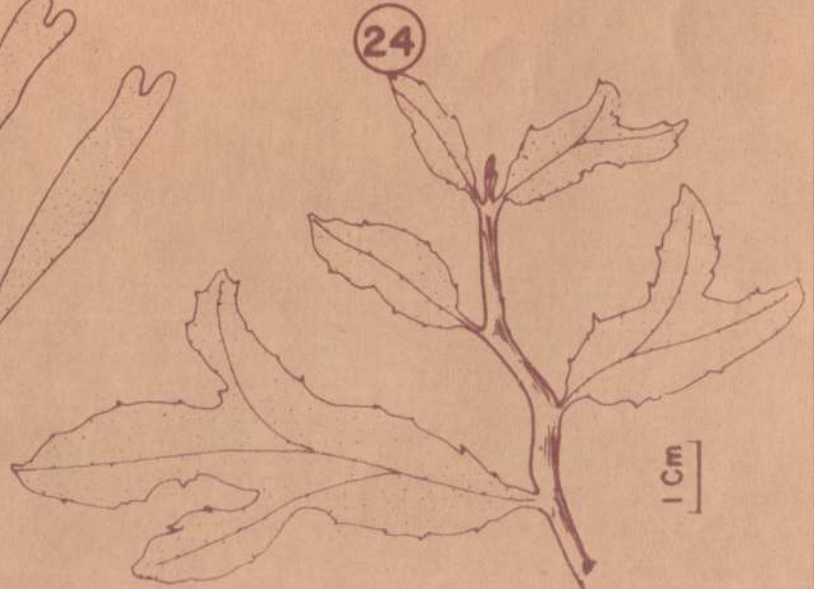
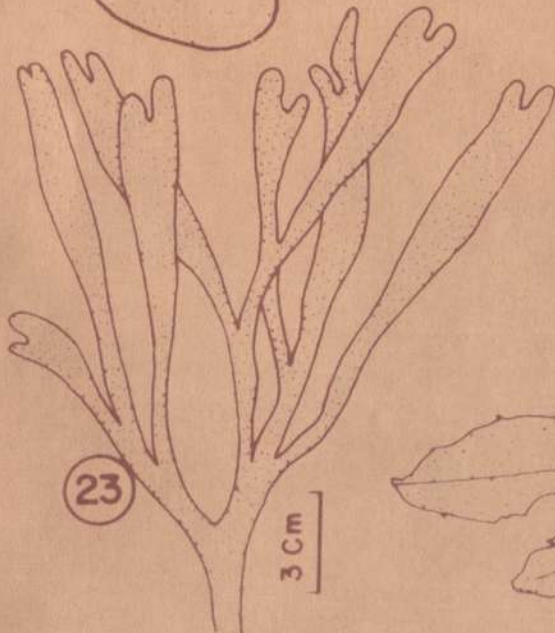
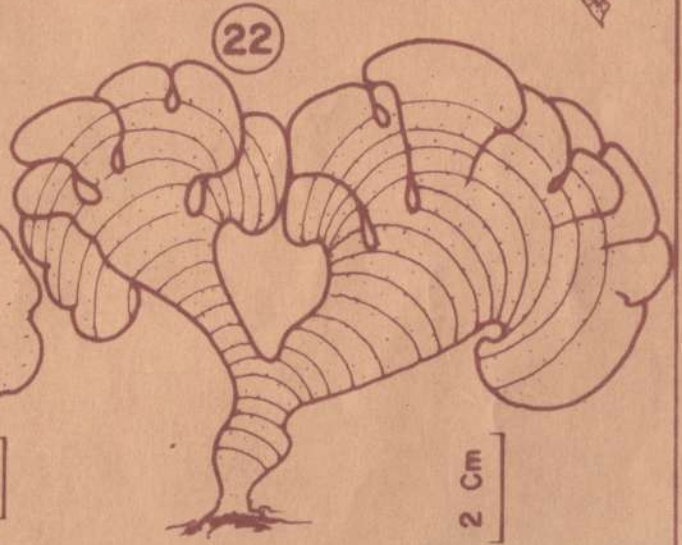
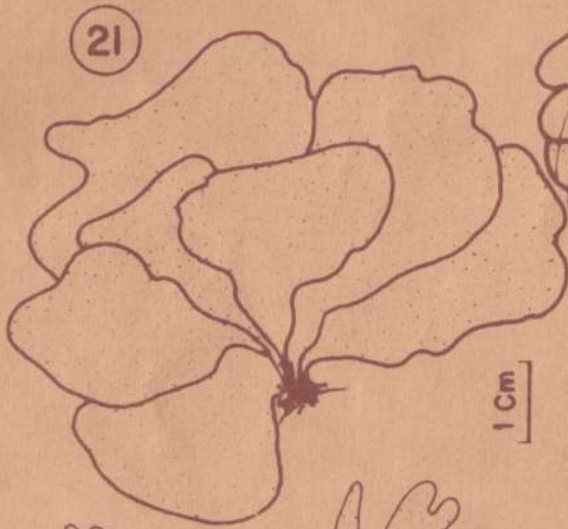
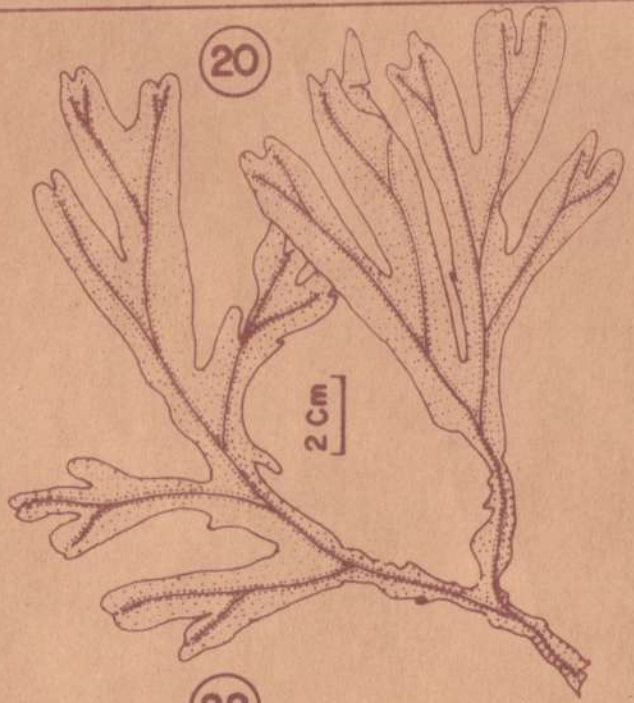
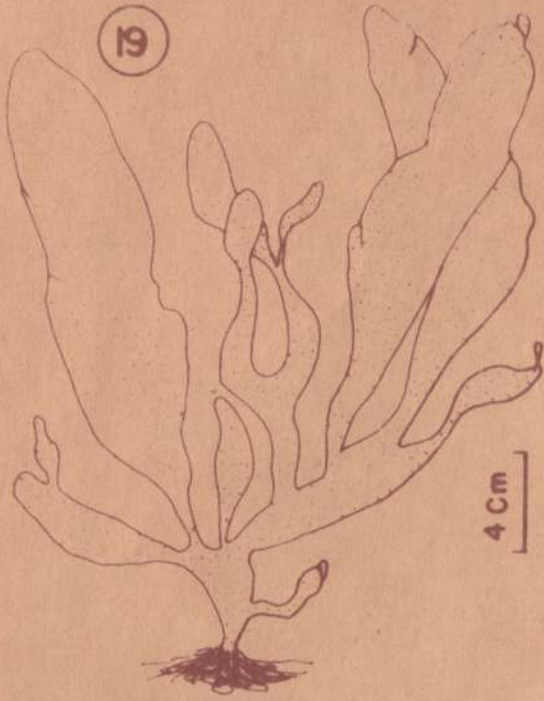




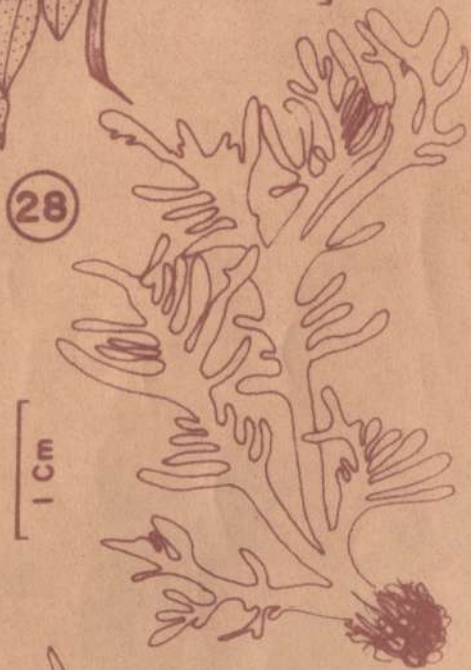
PLATE



PLATE



PLATE



PLATE

