

Marine Flora of Sinop (Black Sea, Turkey)*

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Özet: Sinop (Karadeniz, Türkiye) deniz florası. Bu çalışmada Sinop'un (Karadeniz, Türkiye) üst infralittoral zonu çalışılmıştır. 276 alg ve üç deniz çayıru tayin edilmiştir. Bunlar mavi-yeşil bakteri (22 takson), kırmızı alg (142 takson), kahverengi alg (55 takson), yeşil alg (57 takson) ve üç tanesi de deniz çayırlarıdır. *Gelidiocolax christiana* J. Feldmann et G. Feldmann, *Seirospora giraudyi* (Kützting) De Toni (Rhodophyta), *Cladophora echinus* (Biaosetto) Kützting and *Bryopsis plumosa* (Hudson) C. Agardh var. *prolifera* Schiffner (Chlorophyta) Türkiye denizleri için yeni kayıttır. Ayrıca 17 takson da Türkiye'nin Karadeniz kıyıları için ilk kez verilmiştir (Rhodophyta bölümüne ait, *Acrochaetium moniliforme* (Rosenvinge) Børgesen, *A. subpinnatum* Bornet ex G. Hamel, *Gelidium comeum* (Hudson) J.V. Lamouroux var. *pectinatum* Ardissona&Strafforello, *Gelidiella pannosa* (Feldmann) Feldmann&G. Hamel, *Chrysymenia ventricosa* (Lamour) J. Ag., *Chylocladia verticillata* (Lightfoot) Bliding, *Dasya corymbifera* J. Agardh, *Chondria boryana* (De Notaris ex J. Agardh) De Toni ve *Chondria capillaris* (Hudson) Wynne var. *patens* (Schiffner) V. Aysel ve Heterokontophyta bölümüne ait, *Feldmannia globifera* (Kützting) G. Hamel, *Microcoryne ocellata* Strömfelt ve *Giraudia sphaclarioides* Derbès&Solier, Chlorophyta bölümüne ait, *Enteromorpha prolifera* (O.F. Müller) J. Agardh subsp. *radiata* (J. Agardh) Bliding, *Ulva taeniata* (Setchell) Setchell&Gardner, *Cladophora aegagropila* (Linnaeus) Robenhorst, *Bryopsis corymbosa* J. Agardh and *B. cupressina* J.V. Lamouroux).

Anahtar Kelimeler: Mavi-yeşil bakteriler, kırmızı algler, kahverengi algler, yeşil algler, deniz çayırları.

Abstract: In this study, the upper infralittoral zone of Sinop (Black Sea, Turkey) was researched. 276 algae and three seagrasses were determined. There are (22 taxon) blue-green bacteria, red algae (142 taxon), brown algae (55 taxon), green algae (57 taxon) and seagrasses (3 taxon). *Gelidiocolax christiana* J. Feldmann et G. Feldmann, *Seirospora giraudyi* (Kützting) De Toni (Rhodophyta), *Cladophora echinus* (Biaosetto) Kützting and *Bryopsis plumosa* (Hudson) C. Agardh var. *prolifera* Schiffner (Chlorophyta) were given new record for the Turkish marines. In addition, 17 taxa were given new record for the Turkish coasts of Black Sea (*Acrochaetium moniliforme* (Rosenvinge) Børgesen, *A. subpinnatum* Bornet ex G. Hamel *Gelidium comeum* (Hudson) J.V. Lamouroux var. *pectinatum* Ardissona&Strafforello, *Gelidiella pannosa* (Feldmann) Feldmann&G. Hamel, *Chrysymenia ventricosa* (Lamour) J. Ag., *Chylocladia verticillata* (Lightfoot) Bliding, *Dasya corymbifera* J. Agardh, *Chondria boryana* (De Notaris ex J. Agardh) De Toni, and *Chondria capillaris* (Hudson) Wynne var. *patens* (Schiffner) V. Aysel, which belongs to Rhodophyta division, *Feldmannia globifera* (Kützting) G. Hamel, *Microcoryne ocellata* Strömfelt ve *Giraudia sphaclarioides* Derbès&Solier, which belongs to Heterokontophyta division also *Enteromorpha prolifera* (O.F. Müller) J. Agardh subsp. *radiata* (J. Agardh) Bliding, *Ulva taeniata* (Setchell) Setchell&Gardner, *Cladophora aegagropila* (Linnaeus) Robenhorst, *Bryopsis corymbosa* J. Agardh and *B. cupressina* J.V. Lamouroux, which belongs to Chlorophyta division.

Key Words: Blue-green bacteria, red algae, brown algae, seagrasses.

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Giriş

The first investigations of the Black Sea algae were carried out by Buxbaum (Zinova, 1964), followed by the contributions from Woronichin (1908a, b) and Stockmayer (1909). Meanwhile, Fritsch (1899) also studied the Bosphorus and its environs. The phycological studies along the Black Sea coasts of Turkey can be grouped in three different areas. The province of Kırklareli in the area of west Black Sea region was studied by Aysel et al., (1998) and the area between İğneada and Şile by Zeybek (1973) and Altındağ (1990). Similarly, Bartın in the middle Black Sea was investigated by Aysel et al. (1996) and Zonguldak also by Aysel et al. (1997) and Sinop by Cirik and Cihangir (1987) and Öztürk (1988). The marine algae inhabiting the coast of Ordu located in the eastern part of the Turkish Black Sea

was investigated by Aysel et al. (2000); those collected from Trabzon by Aysel et al. (1990) and Köksal (1993) and Stockmayer (1990); and those collected between Rize and Sarp by Erduğan et al. (1996). In addition to these studies, Aysel and Erduğan (1995) published the phycological check list of Black Sea coasts of Turkey.

As a result of the study dealing with all coasts of the province of Sinop, 21 taxa totally were given new records, 4 of which are for Turkish marine algae and 17 of which are for Black Sea coasts. The total number of taxon of the province was determined to be 276. The total algae number in Black Sea has reached to 297 altogether with these new records.

Sinop belongs geographically to the west Black Sea Region of Turkey. The coastline of the area is about 175 km long and lies between E 34° 13'29" and E 35° 28'17" longitudes. İnce Burun, (N 42° 06') on the Boztepe Peninsula,

is the northernmost point of Sinop, also the northernmost point of Turkey (Figure 1).

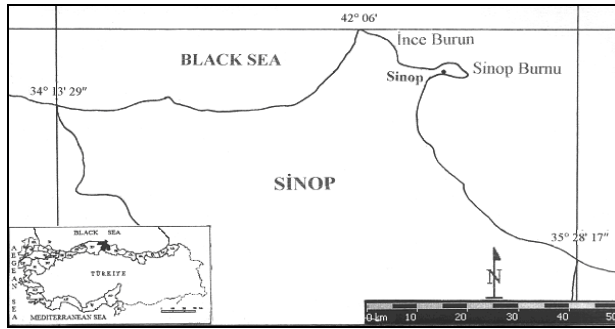


Figure 1. Geographic position of the investigated area.

Except from Boztepe Peninsula, the province coasts are not so jagged. The province coasts extend as far as nearly Yeniköy in the direction of west and east starting from Kastamonu-Sinop province border. From this point it extends towards the direction of southwest and northeast. Starting

from Inceburun the province coasts extent as far as Başyöz cape in the direction of west and east. and then it moves ahead to north west and north east. Sinop peninsula is the extended area of Boztepe peninsula and it extends towards east as far as 8 km. The coast here can be said to be jagged. In fact, an important part of the areas investigated is located here. The coast extends in direction of north south for 15 km starting from Gelincik area. The coasts are very shallow. The province coasts move ahead as far as Kurzuvet cape in direction of north west and south west. The coasts here are in direction of east and north east as far as the province border of Samsun. Sinop has two harbors one of which is in north west and the other of which is in south east. One of the main characteristics of these harbors is that wind is not effective around the harbor area.

The average of salinity between 10 and 18.5. Yearly average of sea water temperature is 15.1°C. Monthly average maximum and minimum water temperature is 26.6°C in August and 5.8°C in March. (Table1, Meteorology Bulletin, 1974).

Table 1. The sea water temperature of Sinop coast (°C, Meteorology Bulletin, 1974)

Months	J	F	M	A	M	J	J	A	S	O	N	D
Average T.	9.8	8.2	7.9	9.3	13.8	18.6	22.6	23.5	21.4	18.7	15.1	11.9
Maximum T.	13.2	10.2	10.2	14.4	19.9	23.3	25.5	26.6	25.1	21.8	20.4	16.5
Minimum T.	7.0	6.0	5.8	6.6	9.3	13.7	19.2	20.1	15.0	12.2	10.6	9.6

Material and Methods

The searching material were the algae belonging to Cyanobacteria, Chlorophyta, Heterokontophyta, Rhodophyta and seagrasses of upper infralittoral zone of the Sinop coasts. The collected examples were fixed in plastic jars and they were added seawater with 4% neutral formalin. Fixed examples were investigated with binocular microscope. Rhodomelaceae and Corallinaceae specimens were studied by 10% HCl.

The material belonging to Cyanobacteria and Rhodophyta (but Corallinales through Bressan and Babbini-Benussi 1995, 1996; Gracilariales according Fredericq and Hommersand, 1989 and Acrochaetiales according Stegenga, 1985) according Silva *et al.* (1996), Heterokontophyta according Ribera *et al.* (1992), Chlorophyta according Gallardo *et al.* (1993) and general checklist (according Ballantine and Aponte, 1997) were placed.

The specimens are kept at the Aegean University Botanical Garden&Herbarium Research and Application Centre.

Results

The algae are listed in Table 2. Evolutionary line given by van Hoek (1997) were used in the systematics from division to "order". Under this, the taxa are listed alphabetically. An (*) in end of the name indicates that the taxon is new to the Black Sea of Turkish coasts, and a (#) indicates that the taxon is new to all Turkish coasts.

Table 2. The list of Sinop marine algae and seagrasses.

CYANOPHYTA (=CYANOBACTERIA)

CYANOPHYCEAE

CHROCOCCALES

CHROCOCCACEAE

Chroococcus dimidiatus (Kützinger) Nägeli

[=*C. turgidus* (Kützinger) Nägeli, *Protococcus turgidus* Kützinger]

DERMOCARPACEAE

Dermocarpa acervata (Setchell & Gardner) Pham Hoàng Hô

[=*Xenococcus acervatus* Setchell & Gardner]

D. cladophorae (Tilden) P. C. Silva

[=*Xenococcus cladophorae* (Tilden) Setchell & Gardner]

MERISMOPEDIAEAE

GOMPHOSPHAERIOIDEA

Gomphosphaeria aponina Kützinger

Microcystis halophila B. Martens & Pankow

[=*Aphanocapsa littoralis* Hansgrig]

M. marina (Hansgrig) P. C. Silva

[=*Aphanocapsa marina* Hansgrig in Foslie]

M. sescianensis (Frémy) V. Aysel & E. Ş. Okudan

[=*Aphanocapsa sescianensis* Frémy]

OSCILLATORIALES

OSCILLATORIAEAE

Lyngbya adriae Ercégovic

L. aestuarii (Mertens) Liebmann

L. confervoides C. Agardh ex Gomont

L. majuscula (Dillwyn) Harvey ex Gomont

Planktolingbya subtilis (West) Anagnostidis & Komàrek

[=*Lyngbya limnetica* Lemmermann]

PHORMIDIACEAE

Phormidium ambiguum Gomont
P. autumnale C. Agardh ex Gomont
P. breve (Kützing) Anagnostidis & Komárek var. *breve*
 [= *Oscillatoria brevis* Kützing var. *brevis*]
P. corallinae (Kützing) Anagnostidis & Komárek
 [= *Leibleinia corallina* Kützing, *Oscillatoria corallinae* (Kützing) Gomont]
Porphyrosiphon martensianus (Meneghini ex Gomont) Anagnostidis & Komárek
 [= *Lyngbya martensiana* Meneghini ex Gomont]

PSEUDOANABAENACEAE

S. tenuis (Meneghini) P.C. Silva
 [= *Anabaena tenuis* Meneghini, *Phormidium tenue* (Meneghini) Gomont]

NOSTOCALES**RIVULARIACEAE**

Calothrix aeruginea (Kützing) Thuret
 [= *Leibleinia aeruginea* Kützing]
C. confervicola (Roth) C. Agardh ex Bornet & Flahault
 [= *C. confervicola* (Dillwyn) C. Agardh, *Conferva confervicola* Dillwyn]
C. crustacea Thuret
C. scopulorum (Weber van Bosse & Mohr) C. Agardh
 [= *Conferva scopulorum* Weber van Bosse & Mohr]
Rivularia polyotis (J. Agardh) Hauck
 [= *Diplotrichia polyotis* J. Agardh]

RHODOPHYTA**RHODOPHYCEAE****BANGIOPHYCIDAE****PORPHYRIDIALES****PORPHYRIDIAEAE**

Chroodactylon ornatum (C. Agardh) Basson
 [= *Asterocystis ornata* (C. Agardh) G. Hamel, *A. ramosa* (Thwaites) Gobi ex F. Schmitz, *Conferva ornata* C. Agardh]
Stylonema alsidii (Zanardini) K. Drew
 [= *Bangia alsidii* Zanardini, *B. elegans* Chauvin, *Stylonema elegans* (Chauvin) *Goniotrichum alsidii* (Zanardini) Howe, *G. elegans* (Chauvin) Zanardini]
S. cornucervi (Reinsch) Hauck
 [= *Goniotrichum cornucervi* (Reinsch) Hauck]

ERYTHROPELTIDALES**ERYTHROTRICHIACEAE**

Erythrotrichia carnea (Dillwyn) J. Agardh
Sahlingia subintegra (Rosenvinge) Kornmann
 [= *Erythrocladia subintegra* Rosenvinge, *Erythropeltis subintegra* (Rosenvinge) Kornmann & Sahling]

BANGIALES**BANGIACEAE**

Bangia atropurpurea (Roth) C. Agardh
 [= *B. fuscopurpurea* (Dillwyn) Lyngbye, *B. versicolor* Kützing, *Conferva atropurpurea* Roth, *C. fuscopurpurea* Dillwyn]
Porphyra leucosticta Thuret in Le Jolis f. *leucosticta*
 [= *P. vulgaris* J. Agardh]
P. minor Zanardini
P. umbilicalis (Linnaeus) Kützing
 [= *Ulva umbilicalis* Linnaeus]

FLORIDEOPHYCIDAE**ACROCHAETIALES****ACROCHAETIACEAE**

Acrochaetium crassipes (Børgesen) Børgesen
 [= *Audouinella crassipes* (Børgesen) Børgesen]
A. hallandicum (Kyllin) G. Hamel
 [= *Audouinella hallandica* (Kyllin) Garbary, *Chantransia hallandica* Kyllin]
A. humile (Rosenvinge) Børgesen
 [= *Audouinella humilis* (Rosenvinge) Garbary]
A. leptonema (Rosenvinge) Børgesen

[= *Audouinella leptonema* (Rosenvinge) Garbary]
A. mahumetanum G. Hamel
 [= *Audouinella mahumetana* (G. Hamel) Garbary]
A. microscopicum (Nägeli ex Kützing) Nägeli
 [= *Audouinella microscopica* (Nägeli in Kützing) Woelkerling, *Callithamnion microscopicum* Nägeli ex Kützing, *Chantransia microscopica* (Nägeli ex Kützing) Ardissonne & Strafforella]
 (*) *A. moniliforme* (Rosenvinge) Børgesen
 [= *Audouinella moniliformis* (Rosenvinge) Garbary, *Kylinia moniliformis* (Rosenvinge) Kyllin]
A. parvulum (Kyllin) Hoyt
 [= *Audouinella parvula* (Kyllin) P. S. Dixon, *Chantransia parvula* Kyllin]
A. rosulatum (Rosenvinge) Papenfuss
 [= *Audouinella rosulata* (Rosenvinge) P. S. Dixon, *Kylinia rosulata* Rosenvinge]
A. secundatum (Lyngbye) Nägeli
 [= *Audouinella secundata* (Lyngbye) Woelkerling, *Callithamnion daviesii* β *secundatum* Lyngbye, *Colaconema secundatum* (Lyngbye) Woelkerling]
 (*) *A. subpinnatum* Bornet ex G. Hamel
 [= *Audouinella subpinnata* (Bornet ex G. Hamel) Garbary]
A. virgatulum (Harvey) Batters
 [= *Audouinella virgatula* (Harvey) P. S. Dixon, *Callithamnion virgatulum* Harvey]

COLACONEMATALES**COLACONEMATAEAE**

Colaconema codicolum (Børgesen), H. Stegenka, J. J. Bolton & R. J. Anderson
 [= *Acrochaetium codicola* Børgesen, *A. Codicolum* Børgesen, *Audouinella codicola* (Børgesen) Garbary]
C. daviesii (Dillwyn) Stegenga
 [= *Acrochaetium daviesii* (Dillwyn) Nägeli, *A. radicans* (Harvey) G. Hamel, *Audouinella daviesii* (Dillwyn) Woelkerling, *Callithamnion radicans* Harvey, *C. sparsum* Harvey, *Chantransia daviesii* (Dillwyn) Thuret, *C. radicans* (Harvey) De Toni, *Conferva daviesii* Dillwyn]
C. membranaceum (Magnus) Woelkerling
 [= *Audouinella membranacea* (Magnus) Papenfuss, *Rhodochorton membranaceum* (Magnus) Hauck]
C. savianum (Meneghini) R. Nielsen
 [= *Acrochaetium savianum* (Meneghini) Nägeli, *Audouinella savianum* (Meneghini) Woelkerling, *Callithamnion savianum* Meneghini, *C. pygmaeum* Kützing]

NEMALIALES**LIAGORACEAE**

Liagora viscida (Forsskål) C. Agardh
 [= *Fucus viscidus* Forsskål]

NEMALIACEAE

Nemalion helminthoides (Velley) Batters
 [= *N. multifidum* (Weber van Bosse & Mohr) J. Agardh, *Rivularia multifida* Weber van Bosse & Mohr]

GELIDIALES**GELIDIACEAE**

Gelidium corneum (Hudson) J.V. Lamouroux var. (*) *pectinatum* Ardissonne & Strafforella
 [= *Gelidium pectinatum* Schousboe et Montagne]
G. crinale (Turner) Gaillon
 var. *crinale*
 [= *G. crinale* (Turner) J. Agardh, *G. corneum* (Hudson) J.V. Lamouroux var. *crinale* (Turner) Greville, *Fucus crinalis* Turner, *Acrocarpus crinalis* (Turner) Kützing]
 var. *corymbosum* (Kützing) J. Feldmann et G. Hamel
 [= *Acrocarpus corymbosus* Kützing]
G. pulchellum (Turner) Kützing
 [= *G. pulchellum* (Turner) Kützing var. *claviferum* (Turner) Feldmann & Hamel, *Fucus comeus* var. *pulcellus* Turner]
G. spathulatum (Kützing) Bornet

[=*Acrocarpus corymbosus* Kützing A. *spathulatus* Kützing G. *crinale* var. *spathulatum* (Kützing) Hauck]
G. spinosum (S.G. Gmelin) P.C. Silva
 var. *spinosum*
 [=*G. latifolium* Bornet ex Hauck, *G. corneum* (Hudson) J.V. Lamouroux]
 var. *hystrix* (J. Agardh) Hauck
 [=*G. latifolium* Bornet ex Hauck var. *hystrix* (J. Agardh) Hauck]
Pterocladia capillacea (S.G. Gmelin) Santelices & Hommersand
 [=*Gelidium capillaceum* (S.G. Gmelin) Kützing f. *capillaceum*, *Pterocladia capillacea* (S.G. Gmelin) Bornet, *P. pinnata* (Hudson) Papenfuss]
 f. *capillacea*
 f. *crinita* (Hauck) comb. nov.
 [=*Gelidium capillaceum* (S.G. Gmelin) Kützing f. *crinita* Hauck]
P. melanoidea (Schousboe ex Bornet) Santelices & Hommersand
 var. *melanoidea*
 [=*Gelidium melanoideum* Schousboe ex Bornet var. *melanoideum*]
 var. *flamentosa* (Schousboe) M. J. Wynne
 [=*Gelidium melanoideum* Schousboe ex Bornet var. *flamentosum* Schousboe]

GELIDIACEAE

Gelidiella antipae Celan
 [=*G. adnata* Dawson]
 (*)*G. pannosa* (Feldmann) Feldmann & G. Hamel
 [=*G. tenuissima* Feldmann & G. Hamel, *Echinocaulon pannosum* Feldmann]
G. ramellosa (Kützing) Feldmann & G. Hamel
 [=*Acrocarpus ramellosus* Kützing, *Gelidium corneum* (Hudson) J.V. Lamouroux var. *ramellosum* (Kützing) Harvey, *G. ramellosum* (Kützing) Trevisan]

GRACILARIALES

GRACILARIACEAE

Gracilaria armata (C. Agardh) Greville
 [=*Sphaerococcus armatus* C. Agardh, *Hypnea armata* (C. Agardh) J. Agardh]
G. dura (C. Agardh) J. Agardh
G. gracilis (Stackhouse) Steentoft, L.M. Irvine & Farnham
 var. *gracilis*
 [=*G. asiatica* Zhang & Xia, *G. confervoides* (Linnaeus) Greville, *G. tikvahiae* Mc Lach., *G. verrucosa* (Hudson) Papenfuss, *Fucus gracilis* Stackhouse]

PTEROCLADIOPHYLLACEAE

(#) *Gelidiocolax christianae* J. Feldmann et G. Feldmann

BONNEMAISONIALES

BONNEMAISONIACEAE

Bonnemaisionia asparagoides Montagne

CORALLINALES

CORALLINACEAE

AMPHIROIDEAE

Amphiroa rigida J.V. Lamouroux

CHOREONEMATOIDEAE

Choreonema thuretii (Bornet) F. Schmitz
 [=*Melobesia thuretii* Bornet in Thuret & Bornet]

CORALLINOIDEAE

CORALLINEAE

Corallina elongata Ellis & Solander
 [=*C. mediterranea* Areschoug]
C. panizzoi Schnetter & V. Richter
 [=*Corallina officinalis* Linnaeus]

JANIEAE

Haloptilon virgatum (Zanardini) Garbary & H.W. Johansen
 [=*Corallina granifera* J. Ellis & Solander]
Jania rubens (Linnaeus) J.V. Lamouroux
 var. *rubens*

[=*Corallina rubens* Linnaeus]
 var. *corniculata* (Linnaeus) Yendo
 [=*J. corniculata* (Linnaeus) J.V. Lamouroux, *Corallina corniculata* Linnaeus]

MASTOPHOROIDEAE

Hydrolythron farinosum (J.V. Lamouroux) D. Penrose & Y.M. Chamberlain
 var. *farinosum*
 [=*Melobesia farinosa* J.V. Lamouroux, *Fosliella farinosa* (J.V. Lamouroux) Howe]
Phymatolithon lenormandii (J.E. Areschoug) W.H. Adey
 [=*Melobesia lenormandii* Areschoug, *Lithothamnium lenormandii* (Areschoug) Foslie]
Pneophyllum confervicola (Kützing) Y.M. Chamberlain
 [=*Fosliella minutula* (Foslie) Ganesan, *Melobesia callithamnoides* (P.L. Crouan & H.M. Crouan) Falkenberg, *M. confervicola* (Kützing) Foslie, *M. minutula* Foslie]

LITHOPHYLLOIDEAE

Lithophyllum cystoseirae (Hauck) Heydrich
 [=*Dermatolithon cystoseirae* (Hauck) Huve, *Titanoderma cystoseirae* (Hauck) Woelkerling, Y.M. Chamberlain & Irvine, *Melobesia cystoseira* Hauck]
L. orbiculatum (Foslie) Foslie
 [=*Pseudolithothamnion orbiculatum* (Foslie) Lemoine]
Titanoderma corallinae (P.L. Crouan & H.M. Crouan) Woelkerling, Chamberlain & P.C. Silva
 [=*Dermatolithon corallina* (P.L. Crouan & H.M. Crouan) Foslie in Børgesen, *Melobesia corallina* P.L. Crouan & H.M. Crouan]
T. pustulatum (J.V. Lamouroux) Nägeli
 [=*Dermatolithon pustulatum* (J.V. Lamouroux) Foslie, *Lithophyllum pustulatum* (J.V. Lamouroux) Foslie, *Melobesia pustulata* J.V. Lamouroux, *Tenera pustulata* (J.V. Lamouroux) Schameel & Tanaka]

MELOBESIOIDEAE

Melobesia membranacea (Esper) J.V. Lamouroux
 [=*Corallina membranacea* Esper, *Hapalidium roseolum* Kützing, *Melobesia corticiformis* Kützing, *Lithothamnion corticiforme* (Kützing) Foslie]

GIGARTINALES

HYPNEACEAE

Hypnea musciformis (Wulfen in Jaquin) J.V. Lamouroux

PEYSSONELICEAE

Peyssonnelia dubyi P.L. Crouan & H.M. Crouan
P. rosamarina Boudouresque & Denizot
P. rubra (Greville) J. Agardh
P. squamaria (S.G. Gmelin) Decaisne

PHYLLOPHORACEAE

Coccotylus truncatus (Pallas) M.J. Wynne & J.N. Heine
 f. *truncatus*
 [=*Phyllophora truncata* (Pallas) Zinova f. *truncata*, *P. brodiaei* (Turner) Endlicher]
Gymnogongrus griffithsiae (Turner) C.F.P. Martius
Phyllophora crispa (Hudson) P.S. Dixon
 f. *crispa*
 [=*P. epiphylla* (O.F. Müller) Batters f. *epiphylla*, *P. rubens* (Goodenough & Woodward) Greville f. *rubens*, *P. nervosa* (A.P. de Candolle) Greville]
P. membranifolia Endlicher
 [=*Phyllophora pseudoceranooides* (S.G. Gmelin) Newroth & A.R.A. Taylor]

RHODYMENIALES

RHODYMENIACEAE

(*)*Chrysmenia ventricosa* (Lamour) J. Ag.

CHAMPIACEAE

(*)*Chylocladia verticillata* (Lightfoot) Bliding
 [=*C. kaliformis* (Goodenough & Woodward) Greville, *C. bistratosa* Ercegovic, *C. squarrosa* (Kützing) Le Jolis]

LOMENTARIACEAE

Lomentaria articulata (Hudson) Lyngbye
var. *articulata*

L. clavellosa (Turner) Gaillon
var. *clavellosa*

HALYMENIALES

GRATELOUPIACEAE

Grateloupia dichotoma J. Agardh
f. *dichotoma*

CERAMIALES

CERAMIACEAE

CALLITHAMNIOIDEAE

CALLITHAMNIEAE

Callithamnion corymbosum (Smith) Lyngbye
C. granulatum (Ducluzeau) C. Agardh
(#)*Seirospora graudyi* (Kützing) De Toni

CERAMOIDEAE

ANTITHAMNIEAE

Antithamnion cruciatum (C. Agardh) Nägeli
var. *cruciatum*
A. tenuissimum (Hauck) Schiffner

CERAMIEAE

Ceramium arborescens J. Agardh
C. ciliatum (Ellis) Ducluzeau
var. *ciliatum*
var. *robustum* (J. Agardh) G. Mazoyer
C. circinatum (Kützing) J. Agardh
C. deslongchampsii Chauvin ex Duby
[=*C. diaphanum* (Lightfoot) Roth var. *strictum* (Kützing) G. Feldmann-Mazoyer, *C. strictum* (Kützing) Rabenhorst nom. illeg.]
C. gaditanum (Clemente) Cremades
var. *gaditanum*
[=*C. flabelligerum* J. Agardh var. *flabelligerum*]
C. rubrum auctorum
var. *rubrum*
[=*C. kondoi* Yendo, *C. pedicellatum* DC, *C. rubrum* var. *rubrum* f. *decurrens* J. Agardh]
var. *implexo-concortum* Solier
C. secundatum Lyngbye
[=*C. rubrum* (Hudson) C. Agardh var. *barbatum* G. Feldmann]
C. siliquosum (Kützing) Maggs & Hommersend
var. *siliquosum*
[=*C. diaphanum* (Lightfoot) Roth var. *diaphanum*, *C. nodosum* (Kützing) Griffiths et Harvey, *C. tenuissimum* (Roth) Areschoug nom. illeg., *C. tenuissimum* (Roth) Areschoug var. *tenellum* G. Feldmann-Mazoyer]
var. *elegans* (Roth) G. Furnari
[=*C. diaphanum* (Lightfoot) Roth var. *elegans*, *C. elegans* (Roth) Ducluz.]
var. *lophophorum* (G. Feldmann-Mazoyer) Serio
[=*C. diaphanum* (Lightfoot) Roth var. *lophophorum* G. Feldmann-Mazoyer]
var. *zostericola* (Feldmann-Mazoyer) G. Furnari
f. *zostericola*
[=*C. diaphanum* (Lightfoot) Roth var. *zostericola* Thuret]
f. *minusculum* (Feldmann-Mazoyer) A. Gomez Garreta, T. Gallardo, M.A. Ribera, M. Cormaci, G. Furnari, G. Giaccone and C.F. Boudouresque
[=*C. diaphanum* (Lightfoot) Roth var. *zostericola* Thuret f. *minusculum* G. Feldmann-Mazoyer]
C. tenerimum (Martens) Okamura
var. *tenerimum*
var. *brevizonatum* (Peterson) G. Feldmann-Mazoyer
C. tenuissimum (Lyngbye) J. Agardh
var. *tenuissimum*

PTEROTHAMNIEAE

Pterothamnion plumula (Ellis) Nägeli
subsp. *plumula*
[=*Antithamnion plumula* (J. Ellis) Thuret, *Platythamnion plumula* (Ellis) Boudouresque, H. Augier & M. Verlaque var. *plumula*]

COMPSOTHAMNIOIDEAE

COMPSOTHAMNIEAE

Compsothamnion thuyoides (J. E. Smith) F. Schmitz

SPERMOTHAMNIEAE

Spermothamnion flabellatum Bornet

DASYACEAE

Dasya baillouviana (S.G. Gmelin) Montagne
var. *baillouviana*
[=*D. elegans* (Martens) C. Agardh, *D. pedicellata* C. Agardh]
(**D. corymbifera* J. Agardh
D. hutchinsiae Harvey in J.W. Hooker
[=*D. arbuscula* Harvey]
D. ocellata (Grateloup) Harvey
Eupogodon spinellus (C. Agardh) Kützing
[=*E. cervicornis* (J. Agardh) Kützing, *Dasyopsis cervicornis* (J. Agardh) F. Schmitz, *D. spinella* (C. Agardh) Zanardini]
Heterosiphonia plumosa (Ellis) Batters

DELESSERACEAE

DELESSERIOIDEAE

APOGLOSSEAE

Apoglossum ruscifolium (Turner) J. Agardh

HYPOGLOSSEAE

Hypoglossum hypoglossoides (Stackhouse) Collins & Harvey
var. *hypoglossoides*
[=*H. crispum* Zanardini] Kützing, *H. woodwardii* Kützing] var. *angustifolia* (Kützing) nomen novum [=*Hypoglossum woodwardii* Kützing var. *angustifolia* Kützing]

NITOPHYLLOIDEAE

NITOPHYLLEAE

Nitophyllum punctatum (Stackhouse) Greville
var. *punctatum*

RHODOMELACEAE

CHONDRIEAE

(**Chondria boryana* (De Notaris ex J. Agardh) De Toni
C. capillaris (Hudson) Wynne
var. *capillaris*
[=*C. tenuissima* C. Agardh var. *tenuissima*]
(*var. *patens* (Schiffner) V. Aysel
[=*Chondria tenuissima* var. *patens* Schiffner]
C. dasyphylla (Woodward) C. Agardh

LAURENCIEAE

Chondrophycus paniculatus (C. Agardh) G. Furnari
[=*Laurencia paniculata* (C. Agardh) J. Agardh, *L. patentiramea* (Montagne) Kützing]
C. papillosus (C. Agardh) Garbary & J. Harper
[=*Laurencia papillosa* (C. Agardh) Greville]
Laurencia obtusa (Hudson) J.V. Lamouroux
var. *obtusa*
var. *gracilis* (Kützing) Hauck
var. *laxa* (Kützing) Ardissonne
[=*L. obtusa* (Hudson) J.V. Lamouroux var. *crucifera* Kützing]
Osmundea pinnatifida (Hudson) Stackhouse
[=*Laurencia pinnatifida* (S.G. Gmelin) J.V. Lamouroux]

POLYSIPHONIEAE

Alsidium corallinum C. Agardh
Herposiphonia secunda (C. Agardh) Ambronn
f. *secunda*
[=*H. tenella* (C. Agardh) Ambronn var. *secunda* (C. Agardh) Hollenberg]
f. *tenella* (C. Agardh) Wynne
[=*H. tenella* (C. Agardh) Ambronn]
Lophosiphonia obscura (C. Agardh) Falkenberg
[=*L. intricata* (J. Agardh) Schiffner, *L. reptabunda* (Shur) Kylin,
Polysiphonia reptabunda Kützing, *Hutchinsia obscura* C. Agardh]
L. subadunca (Kützing) Falkenberg
[=*Polysiphonia subadunca* Kützing]
Polysiphonia aculeata (C. Agardh) Kützing

P. breviarticulata (C. Agardh) Zanardini
P. brodiei (Dillwyn) Sprengel
P. denudata (Dillwyn) Greville
P. deusta (Roth) J. Agardh
P. elongata (Hudson) Harvey in Hooker
P. nigrescens (Hudson) Greville ex Harvey
P. opaca (C. Agardh) Zanardini
P. paniculata Montagne
P. pulvinata Kützing
P. sertularioides (Grateloup) J. Agardh
P. subulifera (C. Agardh) Harvey
P. tenerrima Kützing
P. tripinnata J. Agardh
P. urceolata (Lightfoot ex Dillwyn) Greville
 [= *P. stricta* (Dillwyn) Greville, *P. lepadicola* (Lyngbye) Sprengel]
P. variegata (C. Agardh) Zanardini
P. violacea (Roth) Sprengel

POLYZONIEAE

Dipterosiphonia rigens (Shousboei) Falkenberg

PTEROSIPHONIEAE

Pterosiphonia pennata (Roth) Falkenberg

HETEROKONTOPHYTA

FUCOPHYCEAE (=PHAEOPHYCEAE)

ECTOCARPALES

ECTOCARPACEAE

Acinetospora crinita (Carmichael ex Harvey) Sauvageau
 [= *A. vidovichii* (Meneghini) Sauvageau, *Haplospora vidovichii* (Meneghini) Bornet]
Ectocarpus siliculosus (Dillwyn) Lyngbye
 var. *siliculosus*
 [= *E. confervoides* (Roth) Kjellman, *E. ---* var. *siliculosus* (Dillwyn) Kjellman]
 var. *dasycarpus* (Kuckuck) Gallardo
 [= *E. dasycarpus* Kuckuck]
 var. *hiemalis* (P.L. Crouan ex Kjellman) Gallardo
 [= *E. hiemalis* P.L. Crouan ex Kjellman] Kjellman
 var. *penicillatus* C. Agardh
 [= *Ectocarpus confervoides* f. *penicillata*, *E. penicillatus* (C. Agardh) Kjellman]
Feldmannia caespitula (J. Agardh) Knoepffler-Péguy
 var. *lebelii* (Areschoug ex P.L. Crouan) Knoepffler-Péguy
 [= *F. lebelii* (Areschoug ex P.L. Crouan & H.M. Crouan) G. Hamel]
 (*) *F. globifera* (Kützing) G. Hamel
F. irregularis (Kützing) G. Hamel
 [= *Ectocarpus arabicus* Kützing, *Giffordia conifera* (Børgesen) W.R. Taylor
G. irregularis (Kützing) Joly, *Ectocarpus irregularis* Kützing]
Hincksia sandriana (Zanardini) P.C. Silva
 [= *Ectocarpus sandrianus* Zanardini, *Giffordia sandriana* (Zanardini) G. Hamel]
Kuetzingiella battersii (Bornet ex Sauvageau) Kormmann
 var. *battersii*
 [= *Ectocarpus battersii* Bornet ex Sauvageau, *Feldmannia battersii* (Bornet ex Sauvageau) G. Hamel]
Microsiphon polysiphoniae Kuckuck
Streblonema oligosporum Strömfelt
 [= *Ectocarpus oligosporum* (Strömfelt) Kylin]
S. sphaericum (Derbès & Solier) Thuret

SPHACELARIALES

CLADOSTEPHACEAE

Cladostephus spongiosus (Hudson) C. Agardh
 f. *verticillatus* (Lightfoot) Prod'homme van Reine
 [= *Cladostephus hirsutus* (Linnaeus) C.F. Boudouresque & M. Perret
 Boudouresque in Boudouresque, Perret Boudouresque, & Knoepffler-Péguy,
C. verticillatus (Lightfoot) Lyngbye]

SPHACELARIACEAE

Sphacelaria cirrosa (Roth) C. Agardh
 var. *cirrosa*
 [= *S. hystrix* Suhr ex Reinke]
 var. *mediterranea* Sauvageau

STYPOCAULACEAE

Halopteris filicina (Grateloup) Kützing
H. scoparia Linnaeus Sauvageau
 [= *Stypocaulon scoparium* (Linnaeus) Kützing, *Sphacelaria scoparia* Lyngbye]

DICTYOTALES

DICTYOTACEAE

Dictyota menstrualis (Hoyt) Schmitter, Hornig & Weber-Peukert
 var. *menstrualis*
 [= *D. dichotoma* (Hudson) J.V. Lamouroux var. *dichotoma*]
D. fasciola (Roth) J.V. Lamouroux
 var. *fasciola*
 [= *Dilophus fasciola* (Roth) J.V. Lamouroux, *D. fasciola* (Roth) Howe]
 var. *repens* (J. Agardh) Ardissonne
 [= *Dilophus fasciola* var. *repens* (J. Agardh) Feldmann]
Padina pavonica (Linnaeus) Thivy

CUTLERIALES

CUTLERIACEAE

Zanardinia prototypus Nardo

CHORDARIALES

CORYNOPHLAEACEAE

Corynophlaea umbellata (C. Agardh) Kützing
 (*) *Microcoryne ocellata* Strömfelt
Myriactula arabica (Kützing) Feldmann
 [= *Gonodia arabica* (Kützing) Børgesen, *Phycophila arabica* Kützing]
M. rivulariae (Shur) Feldmann
 [= *Gonodia rivularia* (Shur in Areschoug) G. Hamel]

LACHISTACEAE

Halothrix lumbricalis (Kützing) Reinke

MYRIONEMATACEAE

Ascocyclus orbicularis (J. Agardh) Kjellman
 [= *Myrionema orbiculare* J. Agardh, *M. magnusii* (Sauvageau) Loiseaux, *M. seriatum* (Reinke) Kylin]
Myrionema strangulans Greville
SPERMATOCHNACEAE
Spermatochnus paradoxus (Roth) Kützing
Stilophora nodulosa (C. Agardh) P.C. Silva
 [= *S. tuberculosa* (Horneman) Reinke, *Chaetophora nodulosa* C. Agardh,
Ceramium tuberculosum Hornemann]
S. tenella (Esper) P.C. Silva
 [= *S. rhizoides* (Turner) J. Agardh, *S. rhizoides* J. Agardh nom. illeg., *Fucus tenellus* Esper, *Ceramium tuberculosum* Roth]

DICTYOSIPHONALES

GIRAUDIACEAE

(*) *Giraudia sphacelarioides* Derbès & Solier

MYRIOTRICHIAEAE

Myriotrichia clavaeformis Harvey
 [= *M. repens* (Hauck) Karsakoff, *Discosporangium repens* (Hauck) Hauck]

PUNCTARIACEAE

Asperococcus bullosus Lamouroux
 f. *bullosus*
 [= *A. turneri* (J.E. Smith) Hooker]
A. compressus Griffiths ex Hooker
 [= *Haloglossum compressum* (Griffiths) G. Hamel]
A. fistulosus (Hudson) Hooker
 [= *A. echinatus* (Mertens) Greville]
Punctaria plantaginea (Roth) Greville
P. tenuissima (C. Agardh) Greville
 [= *Desmotrichum undulatum* (J. Agardh) Reinke]

STRIARIACEAE

Striaria attenuata (Greville) Greville
f. *attenuata*

SCYTOSIPHONALES SCYTOSIPHONACEAE

Compsoneima secundum Setchell et Gardner
f. *secundum*
f. *terminale* Setchell et N. L. Gardner
Petalonia zosterifolia (Reinke) O. Kuntze
Scytosiphon simplicissimus (Clemente) Cremades
var. *simplicissimus*

FUCALES

CYTOSEIRACEAE

Cystoseira barbata (Stackhouse) C. Agardh
var. *barbata*
[=C. *hoppii* C. Agardh, *Fucus barbatus* Goodenough & Woodward,
Abratanifolia barbata Stackhouse]
f. *aurantia* (Kützing) Giaccone
[=f. *repens* Zinova & Kalugina]
C. *compressa* (Esper) Gerloff & Nizamuddin
f. *compressa*
[=Cystoseira *abratonifolia* Agardh, C. *fibriata* Sauvageau]
C. *corniculata* (Turner) Zanardini
var. *corniculata*
[=Fucus *ericoides* Linnaeus var. *corniculatus* Turner]
C. *crinita* (Desfontaines) Bory
f. *crinita*
f. *bosphorica* (Sauvageau.) Zinova & Kalugina
C. *schiffneri* G. Hamel
f. *schiffneri*
[=C. *discors* Linnaeus C. Agardh f. *discors*, C. --- f. *dubia*
Ercégovic, C. *ercegovicii* Giaccone f. *ercegovicii*, C. *ercegovicii* Giaccone f.
schiffneri (G. Hamel) Giaccone]

SARGASSACEAE

Sargassum acinarum (Linnaeus) Setchell
[=S. *linifolium* (Turner) C. Agardh]
S. *hornschuchii* C. Agardh
S. *vulgare* C. Agardh
var. *vulgare*
[=S. *vulgare* var. *megalophyllum* (Montagne) Vickers, S. *salicilifolium*
Naccari]

CHLOROPHYTA

CHLOROPHYCEAE

ULOTRICHALES

ULOTRICHACEAE

Ulothrix flacca (Dillwyn) Thuret in Le Jolis
[=U. *pseudoflacca* Wille, U. *speciosa* (Carmichael ex Harvey) Kormmann,
Conferva flacca Dillwyn]
U. *implexa* (Kützing) Kützing
[=Hormiscia *implexa* (Kützing) De Toni]
U. *tenerrima* (Kützing) Kützing
U. *zonata* (Weber van Bosse & Mohr) Kützing

ULVALES

ULVACEAE

Blidingia marginata (J. Agardh) P. Dangeard ex Bliding
[=Enteromorpha *marginata* J. Agardh, E. *complanata* Kützing var.
confervacea Kützing]
B. *minima* (Nägeli ex Kützing) Kylin
var. *minima*
Enteromorpha ahleriana Bliding nom. illeg.
E. *clathrata* (Roth) Greville
[=Conferva *clathrata* Roth]
E. *compressa* (Linnaeus) Nees
var. *compressa*
[=E. *chlorotica* J. Agardh, E. *complanata* Kützing, E. *compressa*
(Linnaeus) Nees var. *complanata* (Kützing) Rabenhorst, E. *compressa*
(Linnaeus) Nees f. *complanata* (Kützing) J. Agardh, *Ulva compressa*
Linnaeus]
E. *flexuosa* (Wulfen) J. Agardh

subsp. *flexuosa*

[=E. *flexuosa* (Wulfen) J. Agardh, E. *intestinalis* (Linnaeus) Nees var.
tubulosa Kützing, E. *intestinalis* f. *tubulosa* (Kützing) V. Chapman, E. *jürgensii*
Kützing, E. *lingulata* J. Agardh, E. *plumosa* Kützing, E. *prolifera* (O.F. Müller)
J. Agardh var. *tubulosa* (Kützing) Batters, E. *tubulosa* (Kützing) Kützing,
Conferva flexuosa Roth, *Ulva flexuosa* Wulfen]
E. *intestinalis* (Linnaeus) Nees
var. *intestinalis*
f. *saprobia* Vinogradova

E. *kylinii* Bliding

[=E. *compressa* (Linnaeus) Nees var. *lingulata* (J. Agardh) Hauck]

E. *linza* (Linnaeus) J. Agardh

var. *linza*

[=E. *bertolonii* Montagne, E. *bertolonii* Montagne var. *lanceolata*
(Linnaeus) Grunov, U. *Lanceolata* Linnaeus U. *Linza* Linnaeus]

var. *crispata* (Bertoloni) J. Agardh

[=Phycoseris *crispata* (Bertoloni) Kützing, *Ulva crispata* Bertoloni]

var. *minor* Schiffneri

E. *muscooides* (Clemente) Cremades

[=E. *clathrata* (Roth) Greville var. *crinita* (Nees) Hauck, E. *clathrata* f.
prostrata (Le Jolis) Batters, E. *complanata* Kützing var. *crinita* (Nees) Kützing,
E. *crinita* Nees, E. *crinita* (Roth) J. Agardh, E. *prolifera* (O.F. Müller) J. Agardh
var. *crinita* (Nees) V. Chapman, E. *ramulosa* (J.E. Smith) Carmichael in W.
Hooker, *Conferva crinata* Roth, *Ulva clathrata* (Roth) C. Agardh [var. *rothiana*]
f. *prostrata* Le Jolis, U. *muscooides* Clemente y Rubio, U. *ramulosa* (J. E.
Smith) Carmichael in W. Hooker]

E. *prolifera* (O.F. Müller) J. Agardh

subsp. *prolifera*

[=E. *compressa* (Linnaeus) Nees var. *prolifera* (O.F. Müller) Greville, E.
compressa (Linnaeus) Nees var. *trichodes* Kützing, E. *polycladus* (Kützing)
Kützing, E. *salina* Kützing var. *polycladus* Kützing, *Ulva prolifera* O.F. Müller]

subsp. *gulariensis* Bliding

(*)subsp. *radiata* (J. Agardh) Bliding

[=E. *fulvescens* Kützing, E. *prolifera* var. *trabeculata* Rosenving, E.
radiata J. Agardh, *Capsosiphon fulvescens*, *Solenia fulvescens* C. Agardh]

Ulva fasciata Delile

var. *fasciata*

[=U. *lactuca* Linnaeus f. *fasciata* (Delile) Hering, U. *latissima* Jadin,
Phycoseris fasciata (Delile) Montagne, P. *lobata* G. Martens]

U. *fenestrata* Postels & Ruprecht

U. *lactuca* Linnaeus

var. *lactuca*

U. *rigida* C. Agardh

f. *rigida*

[=U. *australis* Areschoug, U. *lactuca* Linnaeus var. *rigida* (C. Agardh) Le
Jolis, U. *spatulata* Papenfuss, *Phycoseris gigantea* Kützing var. *perforata*
Kützing, P. *ulva* Sonder, *Letterstedtia petiolata* J. Agardh]

(*)U. *taeniata* (Setchell) Setchell & Gardner

[=Ulva *fasciata* Delile forma *taeniata* Setchell in Collins, Holden & Setchell]

ULVELLACEAE

Ectochaete cladophorae (Hornby) Pnkw

Entocladia leptochaete (Huber) Burrows

[=Acrochaete *leptochaete* (Huber) R.Nielsen, *Ectochaete leptochaete*
(Huber) Burrows]

E. *viridis* Reinke

[=Acrochaete *viridis* (Reinke) R. Nielsen, *Endoderma viride* (Reinke) De
Toni Lagerheim *Phaeophila viridis* (Reinke) Burrows]

Pringsheimiella scutata (Reinke) Höhnelt ex Marchewianka

[=Pringsheimia *scutata* Reinke]

Ulvella lens P. L. Crouan & H. M. Crouan

PHAEOPHILALES

PHAEOPHILACEAE

Phaeophila dendroides (P. L. Crouan & H. M. Crouan) Batters

[=Ochlochaeta *dendroides* P.L. Crouan & H.M. Crouan]

CLADOPHOROPHYCEAE

CLADOPHORALES

CLADOPHORACEAE

Chaetomorpha linum (O.F. Müller) Kützing

[=C. *chlorotica* (Montagne) Kützing, *Conferva chlorotica* Montagne, C.

linum O.F. Müller, *C. rigida* C. Agardh, *Lychaete linum* (O.F. Müller) Areschoug.]
C. mediterranea (Kützing) Kützing
 var. *mediterranea*
 [= *C. capillaris* (Kützing) Børgesen var. *capillaris*]
 (*) *Cladophora aegagropila* (Linnaeus) Robenhorst
 [= *Conferva aegagropila* Linnaeus]
C. albida (Nees) Kützing
 [= *C. gracillima* Harvey, *C. hamosa* (Kützing) Kützing, *C. harveyi* Womersley, *C. magdalenae* Harvey, *C. neesiorum* (C. Agardh) Kützing, *C. scitula* (Suhr) Kützing, *Annulina albida* Nees, *Conferva albida* Hudson nom illeg., *C. neesiorum* C. Agardh, *C. scitula* Suhr, *C. hamosa* Kützing]
C. coelothrix Kützing
 [= *C. repens* Harvey Kützing, *Conferva repens* (J. Agardh) Harvey]
C. dalmatica Kützing
 (#) *C. echinus* (Biasoletto) Kützing
 [= *C. cornea* (Kützing) Kützing, *C. kerkennae* G. Hamel, *Conferva echinus* Biasoletto]
C. glomerata (Linnaeus) Kützing
 var. *glomerata*
 [= *Conferva glomerata* Linnaeus]
C. hutchinsiae (Dillwyn) Kützing
 [= *Conferva hutchinsiae* Dillwyn]
C. laetevirens (Dillwyn) Kützing
 [= *Conferva laetevirens* Dillwyn]
C. lehmanniana (Lindenberg) Kützing
 [= *C. ramulosa* Meneghini, *C. utriculosa* Kützing, *Conferva lehmanniana* Lindenberg]
C. pellucida (Hudson) Kützing
 f. *pellucida*
 [= *C. catenifera* Kützing, *Conferva pellucida* Hudson]
C. prolifera (Roth) Kützing
 [= *C. rugulosa* G. Martens, *Conferva prolifera* Roth, *Apjohnia rugulosa* (G. Martens) G. Murrery]
C. sericea (Hudson) Kützing
 [= *C. nitida* Kützing, *C. ovoidea* Kützing, *C. viridula* Kützing, *Conferva sericea* Hudson]
C. tricotoma (C. Agardh) Kützing
 [= *Conferva tricotoma* C. Agardh]
C. vagabunda (Linnaeus) van den Hoek
Rhizoclonium riparium (Roth) Harvey
 var. *riparium*
 [= *Conferva riparia* Roth, *Tiresias riparia* (Roth) Areschoug]
 var. *implexum* (Dillwyn) Rosenvinge
 [= *Rhizoclonium implexum* (Dillwyn) Kützing, *R. kernerii* Stockmayer, *R. kochianum* Kützing]
R. tortuosum (Dillwyn) Kützing
 [= *R. capillare* Kützing, *Conferva tortuosa* Dillwyn, *C. ligustica* Kützing, *Lola capillaris* (Kützing) G. Hamel, *L. tortuosa* (Dillwyn) V. Champman, *Chaetomorpha capillaris* (Kützing) Børgesen, *C. ligustica* (Kützing) Kützing, *C. tortuosa* Kützing]

BRYOPSIDOPHYCEAE**BRYOPSIDALES****BRYOPSIDACEAE**

(*) *Bryopsis corymbosa* J. Agardh
 (*) *B. cupressina* J. V. Lamouroux
 [= *B. penicillata* Kützing]
B. hypnoides J.V. Lamouroux
 var. *hypnoides*
 [= *B. monoica* Berthold ex Funk]
 var. *flagellata* Kützing
 (#) *B. plumosa* (Hudson) C. Agardh
 var. *plumosa*
 [= *Ulva plumosa* Hudson]
 var. *prolifera* Schiffner

CODIALES**CODIACEAE**

Codium tomentosum Stackhouse

MAGNOLIOPHYTA**LILIOPSIDA (=MONOCOTYLEDONEAE)****ALISMATIDAE (=HELOBIAE veya FLUVIALES)****POTAMOGETONALES****CYMODOCEACEAE**

Cymodocea nodosa (Ucria) Ascherson

ZOSTERACEAE

Zostera marina Linnaeus

Z. noltii Homermann

Discussion

A total of 277 taxa are recorded along the coasts of Sinop. Among them, 22 taxa belong to Cyanophyta; 142 taxa to Rhodophyta; 55 taxa to Heterokontophyta; 57 taxa to Chlorophyta; and three taxa to Magnoliophyta.

While the taxa *Gelidiocolax christiana* J. Feldmann et G. Feldmann and *Seirospora giraudyi* (Kützing) De Toni, which belongs to Rhodophyta, also *Cladophora echinus* (Biasoletto) Kützing and *Bryopsis plumosa* (Hudson) C. Agardh var. *prolifera* Schiffner, which belongs to Chlorophyta, were new records for Turkish coasts (Figure 2.), *Acrochaetium monilliforme* (Rosenvinge) Børgesen, *A. subpinnatum* Bornet ex G. Hamel *Gelidium corneum* (Hudson) J.V. Lamouroux var. *pectinatum* Ardissonne&Strafforello, *Gelidiella pannosa* (Feldmann) Feldmann&G. Hamel, *Chrysymenia ventricosa* (Lamour) J. Ag., *Chylocladia verticillata* (Lightfoot) Bliding, *Dasya corymbifera* J. Agardh, *Chondria boryana* (De Notaris ex J. Agardh) De Toni and *Chondria capillaris* (Hudson) Wynne var. *patens* (Schiffner) V. Aysel which belongs to Rhodophyta, *Feldmannia globifera* (Kützing) G. Hamel, *Microcoryne ocellata* Strömfelt ve *Giraudia sphacelarioides* Derbès&Solier which belongs to Heterokontophyta division also *Enteromorpha prolifera* (O.F. Müller) J. Agardh subsp. *radiata* (J. Agardh) Bliding, *Ulva taeniata* (Setchell) Setchell & Gardner, *Cladophora aegagropila* (Linnaeus) Robenhorst, *Bryopsis corymbosa* J. Agardh and *B. cupressina* J.V. Lamouroux, which belongs to Chlorophyta, taxa were new ones for the Turkish coasts of Black Sea.

Sinop coast has the richest as the algal flora of Black Sea shore according Aysel et al. (1990, 1995, 1996, 1997, 1998), Cirik and Cihangir (1987), Erduğan et al. (1996), Fritsch (1899), Köksal and Özer (1993), Öztürk (1988) and Zeybek (1973). It is possible to find at least one taxon of every genus, which is distributed in the Black Sea. Especially bays like inlets and small fisherman shelters contain *Lyngbya confervoides* C. Agardh ex Gomond, *Rivularia polyotis* (C. Agardh) Hauck (Cyanobacteria), *Bangia atropurpurea* (Roth) C. Agardh, *Porphyra leucosticta* Thuret in Le Jolis f. *leucosticta*, *Halitilon virgatum* (Zanardini) Garbary et H.W. Johansen, *Gelidium* and *Pterocladella* species and epiphytic *Acrochaetium* species (Rhodophyta), *Padina pavonica* (Linnaeus) Thivy, *Dictyota menstrualis* (Hoyt) Schnetter, Hornig&Weber-Peukert var. *menstrualis*, *Dictyota fasciola* (Roth) J.V. Lamouroux var. *fasciola*, *Cystoseira barbata* (Stackhouse) C. Agardh var. *barbata*, *C. schiffneri* G. Hamel f. *schiffneri* (Heterokontophyta), *Enteromorpha kyllinii* Bliding, *E. linza* (Linnaeus) J. Agardh var. *linza*, *Ulva fasciata* Delile var.

fasciata and *Cladophora pellucida* (Hudson) Kützing f. *pellucida* (Chlorophyta). Algal diversity and abundance is given in Table 3. The ratio of dominance is given in Table 4. The rates of R/H and R/Cy are high in that the red algae are of

high number. Those of H/C and H/Cy are low due to high taxon number of green algae and Cyanobacteria. These results show that every division was investigated carefully.

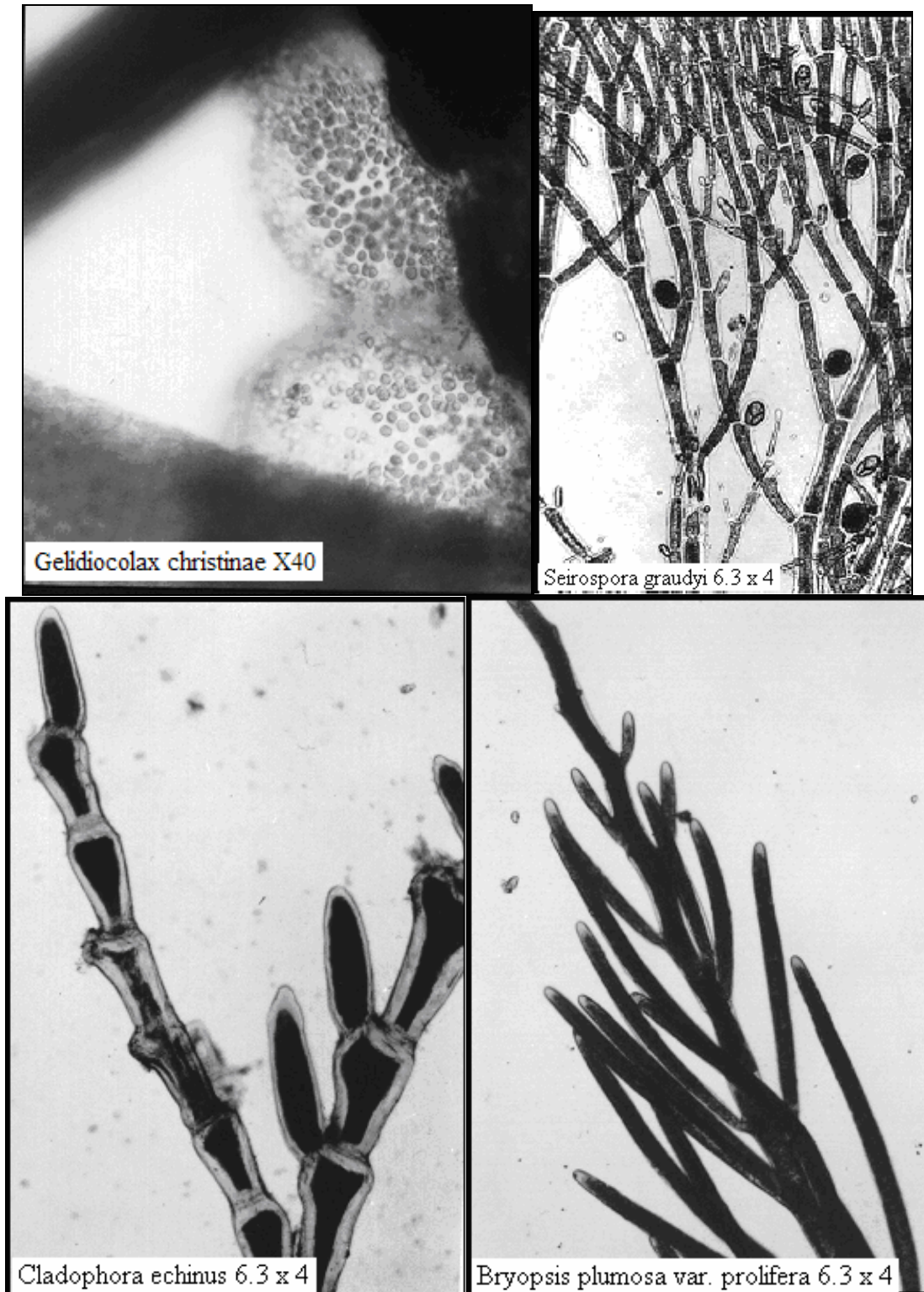


Figure 2. New records for the Algal flora of Turkey.

Table 3. Comparing the algal taxa of Sinop with other Black Sea cities of Turkey. SN: Sinop, KR: Kırklaeli, ZN: Zonguldak, BR: Bartın, SM: Samsun, OR: Ordu, TR: Trabzon, RZ: Rize-Sarp, BNR:Black Sea New Record, TNR: Turkey New Record, BS: Black Sea, R: Rhodophyta, H: Heterokontophyta, C: Chlorophyta, Cy: Cyanobacteria.

Divisio	SN	KR	ZN	BR	SM	OR	TR	RZ	BNR	TNR	BS
Cyanobacteria (Cy)	22	23	20	12	21	14	1	3	-	-	30
Rhodophyta (R)	142	71	100	116	106	93	23	43	11	2	142
Heterokontophyta (H)	55	24	42	43	27	27	8	15	3	-	57
Chlorophyta (C)	57	30	43	39	20	26	23	27	7	2	58
Total	276	148	205	210	174	160	55	88	21	4	287

Table 4. Comparing of the floristic ratios of Sinop with other Black Sea cities of Turkey. SN: Sinop, KR: Kırklaeli, ZN: Zonguldak, BR: Bartın, SM: Samsun, OR: Ordu, TR: Trabzon, RZ: Rize-Sarp, BS: Black Sea, R: Rhodophyta, H: Heterokontophyta, C: Chlorophyta, Cy: Cyanobacteria.

Ratio	SN	KR	ZN	BR	SM	OR	TR	RZ	BS
R/H	2.58	2.96	2.38	2.70	3.93	3.44	2.88	2.87	2.49
R/C	2.49	2.37	2.33	2.97	5.30	3.58	1.00	1.59	2.45
R/Cy	6.45	3.09	5.00	9.67	5.05	6.64	23.00	14.33	4.73
H/C	0.96	0.80	0.98	1.10	1.35	1.04	0.35	0.56	0.98
H/Cy	2.50	1.04	2.10	3.58	1.29	1.93	8.00	5.00	1.90
C/Cy	2.59	1.30	2.15	3.25	0.95	1.86	23.00	9.00	1.93

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