

Marine algae and Seagrasses of Giresun Shores (Black Sea, Turkey)

Giresun Kıyılarının Deniz Algleri ve Deniz Çayırıları

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Abstract

In this study, marine algae and sea grasses in the upper infralittoral zone of the Black Sea coast of Giresun (Black Sea, Turkey) have been examined. Totally 193 taxa have been determined. 18 of them belong to blue-green bacteria (*Cyanobacteria*), 109 to red algae (*Rhodophyta*), 33 to brown algae (*Ochrophyta*), 30 to green algae (*Chlorophyta*) and 3 to sea grasses (*Magnoliophyta*). *Erythrotrichia investiens*, *E. vexillaris*, *Lophosiphonia scopulorum* and *Spermothamnion repens* var. *flagelliferum* are new records for Turkish shores of the Black Sea.

Key Words: algae, seagrasses, Giresun, Black Sea, Turkey

Introduction

According to Zinova (1964), the earliest study on Turkish algae was performed by Buxbaum (1740), Tchichatcheff (1860), Sperk (1869) and Zernow (1913). Additionally, Agardh (1822-1823, 1828), Fritsch (1899), Dratzuyan (1894-1895), Woronichin (1908a, b), Stockmayer (1909), Güven (1970), Zeybek (1973), Cirik and Cihangir (1987), Altındağ (1987), Öztürk (1988), Aysel and Erduğan (1995), Aysel *et al.* (1990, 1996, 1997, 1998, 2000, 2004, 2005 (in press), Özer and Köksal (1993), Erduğan *et al.* (1996, 2003), have also carried out floristic studies on Black sea coasts of Turkey

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Material and Method

Collected specimens were fixed using 4 % formaldehyde for long term preservation. Specimens belonging to *Rhodomelaceae* and *Corallinaceae* were exceptionally treated with 10 % HCl because of their specific cell wall properties in identification procedures.

Classes were arranged according to different authors [*Rhodophyceae* (Benhissoune *et al.*, 2002b), *Fucophyceae* (Ribera *et al.*, 1992, Benhissoune *et al.*, 2002a), *Chlorophyceae* (Gallardo *et al.*, 1993, Benhissoune *et al.*, 2001)]. Arrangement of lower categories (order and families) presented in the list were followed by specialists [*Corallinales* (Bressan and Babbini-Benussi 1995, 1996), *Gracilariales* (Frederic and Hommersand, 1989), *Ceramiales* (Gomez Garreta *et al.*, 2001, Benhissoune *et al.*, 2003), *Acrochaetiaceae* (Stegenga, 1985)]. Additionally, the studies of Silva *et al.* (1996), Van den Hoek *et al.* (1997), Barbara and Cremades (1996), Ballantine and Aponte (1997), Hardy and Guiry (2003) and Guiry and Dhonncha (2005) were used to create an evolutionary list of taxa in genus level. Taxa in specific or infraspecific level are listed in alphabetical order.

Results

Giresun is situated between $38^{\circ} 06' 12''$ and $39^{\circ} 09' 38''$ East longitudes (Figure 1). The majority parts of the sea shore is observed to be sandy and tin pebbly beach which do not form the conditions that algae need to develop. On the other hand, some samples have been collected from the study areas: Piraziz, Bulancak, Keşap, Espiye, Gülburnu, Tirebolu, Görele and Eynesil where rocky areas exist and shelters are located.

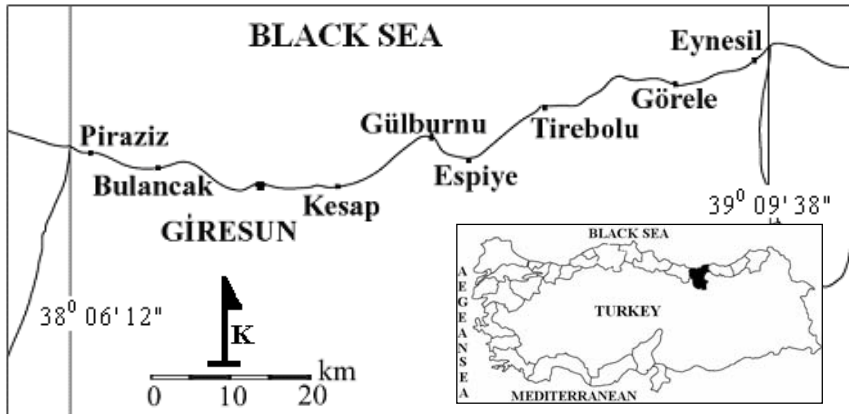


Figure 1: Map of the studied shores

Taxa distributed in study area are listed in table 1. New records for the Turkish shores of the Black Sea are indicated an asteriks (*).

Table 1: Taxa distributed on Giresun (black sea) coasts of Turkey

CYANOPHYTA (=CYANOBACTERIA)	NOSTOCALES
CYANOPHYCEAE	RIVULARIACEAE
CHROOCOCCALES	<i>Calothrix aeruginea</i> (Kützing)
CHROOCOCCACEAE	Thuret
<i>Chroococcus dimidiatus</i> (Kützing)	<i>C. confervicola</i> (Roth) C. Agardh ex
Nägeli	Bornet and Flahault
DERMOCARPACEAE	<i>C. crustacea</i> Thuret
<i>Dermocarpa acervata</i> (Setchell and	<i>C. scopulorum</i> (Webervan Bosse and
Gardner) Pham Hoàng Hô	Mohr) C. Agardh
OSCILLATORIALES	<i>Rivularia polyotis</i> (J. Agardh)
OSCILLATORIACEAE	Hauck
<i>Lyngbya adriae</i> Ercégovic	PLANTAE
<i>L. aestuarii</i> (Mertens) Liebmann	BILIPHYTA
<i>L. confervoides</i> C. Agardh ex	RHODOPHYTA
Gomont	RHODELLOPHYTINA
<i>L. majuscula</i> (Dillwyn) Harvey ex	RHODELLOPHYCEAE
Gomont	STYLONEMATALES
<i>Oscillatoria curviceps</i> C. Agardh	STYLONEMATAACEAE
PHORMIDIACEAE	<i>Stylonema alsidii</i> (Zanardini)
PHORMIDIOIDEAE	K. Drew
<i>Phormidium ambiguum</i> Gomont	<i>S. cornu-cervi</i> (Reinsch) Hauck
<i>P. autumnale</i> C. Agardh ex Gomont	COMPSOPOGONOPHYCEAE
<i>P. corallinae</i> (Kützing)	ERYTHROPELTIDALES
Anagnostidis and Komárek	ERYTHROTRICHIACEAE
<i>P. rotheanum</i> Itzigsohn	<i>Erythrotrichia carnea</i> (Dillwyn)
var. <i>capitatum</i> (Skuja)	J. Agardh
Desikachary	* <i>E. investiens</i> (Zanardini) Bornet
PSEUDOANABAENACEAE	* <i>E. vexillaris</i> (Montagne) G. Hamel
<i>Spirocoleus tenuis</i> (Meneghini)	<i>Sahlingia subintegra</i> (Rosenvinge)
P.C. Silva	Kornmann
LEPTOLYNGBYOIDEAE	MACRORHODOPHYTINA
<i>Planktolynngbya. subtilis</i> (West)	BANGIOPHYCEAE
Anagnostidis and Komarek	BANGIOPHYCIDAE
	GONIOTRICHIALES

GONIOTRICHACEAE

Chroodactylon ornatum (C.
Agardh) Basson

BANGIALES

BANGIACEAE

Bangia atropurpurea (Roth)
C. Agardh

Porphyra leucosticta Thuret in
Le Jolis

f. *leucosticta*

P. umbilicalis (Linnaeus) Kützing

FLORIDEOPHYCEAE

NEMALIOPHYCIDAE

ACROCHAETIALES

ACROCHAETIACEAE

Acrochaetium hallandicum (Kylin)
G. Hamel

A. mahumetanum G. Hamel

A. mediterraneum (Levring)
Boudouresque

A. microscopicum (Nägeli ex
Kützing) Nägeli

A. parvulum (Kylin) Hoyt

A. rosulatum (Rosenvinge)
Papenfuss

A. savianum (Meneghini) Nägeli

A. secundatum (Lyngbye) Nägeli

A. virgatulum (Harvey) Batters

COLACONEMATALES

COLACONEMATACEAE

Colaconema daviesii (Dillwyn)
Stegenga

C. membranaceum (Magnus)
Woelkerling

NEMALIALES

LIAGORACEAE

Liagora viscida (Forsskål)
C. Agardh

NEMALIACEAE

Nemalion helminthoides (Velley)
Batters

RHODYMENIOPHYCIDAE

GELIDIALES

GELIDIACEAE

Gelidium spinosum (S.G. Gmelin)
P.C. Silva

var. *spinosum*

var. *hystrix* (J. Agardh)

G. Furnari

Pterocladia capillacea (S.G.
Gmelin) Santelices and

Hommersand

f. *capillacea*

GELIDIPELLACEAE

Gelidiella ramellosa (Kützing)
Feldmann and G. Hamel

Parviphycus antipai (Celan)

B. Santelices

GRACILARIALES

GRACILARIACEAE

Gracilaria dura (C. Agardh)
J. Agardh

G. gracilis (Stackhouse) Steentoft,
L.M. Irvine and Farnham

var. *gracilis*

CORALLINALES

CORALLINACEAE

AMPHIROIDEAE

Amphiroa rigida J.V. Lamouroux

CORALLINOIDEAE

CORALLINEAE

Corallina elongata Ellis and Solander
C. officinalis Linnaeus

JANIEAE

Halitilon virgatum (Zanardini)
Garbary and H.W. Johansen

Jania rubens (Linnaeus)

J.V. Lamouroux

var. *rubens*

var. *corniculata* (Linnaeus)

Yendo

MASTOPHOROIDEAE

Hydrolithon farinosum (J.V.
Lamouroux) D. Penrose and
Y.M. Chamberlain
var. *farinosum*

LITHOPHYLLOIDEAE

Lithophyllum cystoseirae (Hauck)
Heydrich
Titanoderma pustulatum (J.V.
Lamouroux) Nägeli

GIGARTINALES

HYPNEACEAE

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

PEYSSONNELICEAE

Peyssonnelia rosa-marina
Boudouresque and Denizot
P. rubra (Greville) J. Agardh
P. squamaria (S.G. Gmelin)
Decaisne

PHYLLOPHORACEAE

Coccotylus truncatus (Pallas)
M.J. Wynne and J.N. Heine
f. *truncatus*
Gymnogongrus griffithsiae (Turner)
C.F.P. Martius
Phyllophora crispa (Hudson)
P.S. Dixon
f. *crispa*
P. pseudoceranoïdes (S.G. Gmelin)
Newroth and A.R.A. Taylor

RHODYMENIALES

LOMENTARIACEAE

Lomentaria articulata (Hudson)
Lyngbye
var. *articulata*
L. clavellosa (Turner) Gaillon

HALYMENIALES

GRATELOUPIACEAE

[=HALYMENIACEAE]

Grateloupia dichotoma J. Agardh

CERAMIALES

CERAMIACEAE

CALLITHAMNIOIDEAE

CALLITHAMNIEAE

Aglaothamnion tenuissimum
(Bonnemaison) G. Feldmann-
Mazoyer
var. *tenuissimum*

Callithamnion corymbosum (Smith)

Lyngbye

C. granulatum (Ducluzeau) C.
Agardh

CERAMOIDEAE

ANTITHAMNIEAE

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

CERAMIEAE

Ceramium ciliatum (Ellis)

Ducluzeau

var. *ciliatum*

var. *robustrum* (J. Agardh)

Mazoyer

C. circinatum (Kützing) J. Agardh

C. codii (H. Richards) Feldmann-
Mazoyer

C. deslongchampsii Chauvin ex
Duby

C. gaditanum (Clemente) Cremades

var. *gaditanum*

C. rubrum auctorum

var. *rubrum*

var. *implexo-concortum* (Solier)

G. Feldmann Mazoyer

C. secundatum Lyngbye

C. siliquosum (Kützing) Maggs and

- Hommersend
 var. *siliquosum*
 var. *elegans* (Roth) G. Furnari
 var. *tenuissimum* (Lyngbye)
 V Aysel, B Dural Tarakçı,
 H Erduğan, F Aysel, E Türker,
 Y Tarakçı
 var. *zostericola* (Feldmann
 Mazoyer) G. Furnari
 f. *zostericola*
 f. *minusculum* (Feldmann
 Mazoyer) A. Gomez-
 Garreta, T. Gallardo,
 M.A. Ribera, M. Cormaci,
 G. Furnari, G. Giaccone and
 C.F. Boudouresque
C. tenerrimum (Martens) Okamura
 var. *tenerrimum*
 var. *brevizonatum* (Peterson)
 G. Feldmann-Mazoyer
- PTEROTHAMNIEAE
Pterothamnion plumula (Ellis)
 Nägeli
 subsp. *plumula*
- COMPSOTHAMNIOIDEAE
 COMPSOTHAMNIEAE
Compsothamnion thuyoides (J.E.
 Smith) F. Schmitz
- SPERMOTHAMNIEAE
 **Spermothamnion repens* (Dillwyn)
 Rosenvinge
 var. *flagelliferum* (De Notaris)
 G. Feldmann-Mazoyer
- DASYACEAE
Dasya baillouviana (S.G. Gmelin)
 Montagne
 var. *baillouviana*
D. hutchinsiae Harvey in
 J.W. Hooker
Eupogodon planus (C. Agardh)
 Kützing
- DELESSERiaceae
 DELESSERIOIDEAE
 APOGLOSSEAE
Apoglossum ruscifolium (Turner)
 J. Agardh
- HYPOGLOSSEAE
Hypoglossum hypoglossoides
 (Stackhouse) F.S. Collins and
 Harvey
 var. *hypoglossoides*
- NITOPHYLLOIDEAE
 NITOPHYLLEAE
Nitophyllum punctatum
 (Stackhouse) Greville
 var. *punctatum*
 var. *ocellatum* (J.V. Lamouroux)
 J. Agardh
- RHODOMELACEAE
 CHONDRIEAE
Chondria capillaris (Hudson)
 Wynne
 var. *capillaris*
 var. *patens* (Schiffner) V Aysel,
 H Erduğan, E Ş Okudan,
 H Erk
 var. *subtilis* (Hauck) V Aysel,
 H Erduğan, E Ş Okudan,
 H Erk
C. dasyphylla (Woodward)
 C. Agardh
- LAURENCIEAE
Chondrophyucus paniculatus (C.
 Agardh) G. Furnari
C. papillosus (C. Agardh) Garbary
 and J. Harper
Laurencia obtusa (Hudson)
 J.V. Lamouroux
 var. *obtusa*
 var. *gracilis* (Kützing) Hauck
 var. *laxa* (Kützing) Ardissonne
Osmundea pinnatifida (Hudson)
 Stackhouse

POLYSIPHONIEAE

Alsidium corallinum C.Agardh
Herposiphonia secunda (C.
Agardh) Ambronn
f. *secunda*
f. *tenella* (C. Agardh) Wynne
Lophosiphonia obscura (C.
Agardh) Falkenberg
**L. scopulorum* (Harvey)
Womersley
L. subadunca (Kützing) Falkenberg
Neosiphonia elongella (Harvey)
M.S.Kim and I.K.Lee
Polysiphonia brodiei (Dillwyn)
Sprengel
P. denudata (Dillwyn) Greville *ex*
Harvey
P. elongata (Hudson) Harvey *in*
Hooker
P. fucoides (Hudson) Greville
P. opaca (C. Agardh) Moris and
De Notaris
P. sertularioides (Grateloup)
J. Agardh
P. tenerrima Kützing
P. variegata (C. Agardh) Zanardini
P. vidovichii Meneghini
P. violacea (Roth) Sprengel

POLYZONIEAE

Dipterosiphonia rigens (Shousboei)
Falkenberg

CHROMISTA

HETEROKONTA

OCHROPHYTA

[=HETEROKONTOPHYTA]

FUCOPHYCEAE

[=PHAEOPHYCEAE,

PHAEOZOOSPOROPHYCEAE]

ECTOCARPALES

ECTOCARPACEAE

Acinetospora crinita (Carmichael *ex*
Harvey) Kornmann

Ectocarpus siliculosus (Dillwyn)

Lyngbye

var. *siliculosus*
var. *arctus* (Kützing) Kuckuck
var. *dasycarpus* (Kuckuck)
Gallardo
var. *hiemalis* (P.L. Crouan
ex Kjellman) Gallardo
var. *penicillatus* C. Agardh
Feldmannia caespitula (J. Agardh)
Knoepffler-Péguy
var. *caespitula*
var. *lebelii* (Areschoug *ex*
P.L. Crouan) Knoepffler-Péguy
F. irregularis (Kützing) G. Hamel
Mikrosyphar polysiphoniae
Kuckuck
Streblonema sphaericum (Derbès *and*
Solier) Thuret

CHORDARIALES

MYRIONEMATACEAE

Myrionema strangulans Greville

ELACHISTACEAE

Halothrix lumbricalis (Kützing)
Reinke

CORYNOPHLAEACEAE

Corynophlaea umbellata (C.

Agardh) Kützing
Myriactula arabica (Kützing)
Feldmann

M. rivulariae (Shur) Feldmann

SPERMATOCHNACEAE

Stilophora nodulosa (C. Agardh)

P.C. Silva
S. tenella (Esper) P.C. Silva

CUTLERIALES

CUTLERIACEAE

Zanardinia typus (Nardo)
G. Furnari

SPHACELARIALES

SPHACELARIACEAE

Sphacelaria cirrosa (Roth)

C. Agardh

f. *cirrosa*

STYPOCAULACEAE

Halopteris scoparia Linnaeus

Sauvageau

CLADOSTEPHACEAE

Cladostephus spongiosus (Hudson)

C. Agardh

f. *spongiosus*f. *verticillatus* (Lightfoot)

Prod'homme van Reine

DICTYOTALES

DICTYOTACEAE

Dictyopteris polypodioides (A.P. de Candolle) J.V. Lamouroux*Dictyota fasciola* (Roth)

J.V. Lamouroux

var. *fasciola**D. menstrualis* (Hoyt) Schnetter,

Hornig and Weber-Peukert

var. *menstrualis*

DICTYOSIPHONALES

MYRIOTRICHACEAE

Myriotrichia clavaeformis Harvey

STRIARIACEAE

Striaria attenuata (Greville)

Greville

f. *attenuata*f. *fragilis* (J. Agardh) Kjellman

PUCTARIALES

PUNCTARIACEAE

Punctaria plantaginea (Roth)

Greville

FUCALES

CYSTOSEIRACEAE

Cystoseira barbata (Stackhouse)

C. Agardh

var. *barbata**C. crinita* (Desfontaines) Boryf. *crinita*f. *bosphorica* (Sauvageau.)

Zinova and Kalugina

CHLOROPHYTA

CHLOROPHYCEAE

ULVOPHYCEAE

ULOTRICHALES

ULOTRICHACEAE

Ulothrix flacca (Dillwyn) Thuret in Le Jolis

ULVALES

ULVELLACEAE

Ulvella lens P. L. Crouan and

H. M. Crouan

ULVACEAE

Blidingia marginata (J. Agardh)

P. Dangeard ex Bliding

B. minima (Nägeli ex Kützing)

Kyllin

Enteromorpha clathrata (Roth)

Greville

E. compressa (Linnaeus) Neesvar. *compressa**E. flexuosa* (Wulfen) J. Agardhsubsp. *flexuosa**E. intestinalis* (Linnaeus) Neesvar. *intestinalis**E. kylinii* Bliding*E. linza* (Linnaeus) J. Agardhvar. *linza**E. muscoides* (Clemente) Cremades*E. prolifera* (O.F. Müller) J. Agardhsubsp. *prolifera**Ulva fasciata* Delile*U. fenestrata* Postels and Ruprecht*U. rigida* C. Agardhf. *rigida*

CLADOPHOROPHYCEAE
CLADOPHORALES
CLADOPHORACEAE
Chaetomorpha aerea (Dillwyn)
Kützing
C. linum (O.F. Müller) Kützing
Cladophora albida (Nees) Kützing
C. fracta (O.F. Müller ex Vahl)
Kützing
C. glomerata (Linnaeus) Kützing
var. *glomerata*
C. hutchinsiae (Dillwyn) Kützing
C. laetevirens (Dillwyn) Kützing
C. pellucida (Hudson) Kützing
f. *pellucida*
C. sericea (Hudson) Kützing
Rhizoclonium riparium (Roth)
Harvey
R. implexum (Dillwyn) Kützing
R. tortuosum (Dillwyn) Kützing

BRYOPSISIDOPHYCEAE
BRYOPSISDALES
BRYOPSISACEAE
Bryopsis hypnoides J.V. Lamouroux
var. *hypnoides*
B. plumosa (Hudson) C. Agardh
var. *plumosa*

TRACHEOPHYTA
LILIOPSIDA
CYMODOCEALES
CYMODOCEACEAE
Cymodocea nodosa (Ucria)
Ascherson

ZOSTERALES
ZOSTERACEAE
Zostera marina Linnaeus
Z. noltii Homermann

Discussion

In this study, 193 taxa to Magnoliophyta (3), Chlorophyta (30), Ochrophyta (33), *Rhodophyta* (109) and *Cyanophyta* (18) have been found. Although similar Algal composition is observed on different parts of the Black Sea coastal line, the density of the algae is distinctive at each station. Different types of algae such as *Ulva*, *Enteromorpha*, *Callithamnion*, *Ceramium* and *Polysiphonia* are also observed at these stations. The coast line of Bulancak on which there was no *Cystoseira* is monitored, is observed to be polluted. The station around the light house at Espiye is the richest algae area which attracts attention with its clean water. *Padina*, *Zanardinia*, *Cystoseira*, *Ceramium*, *Polysiphonia*, *Laurencia*, *Gelidium* and *Dictyota* formed a massive density of vegetation which can be described as a sea forest in this area. Generally, *Cladophora*, *Ulva*, *Corallina* and *Cystoseira* are dominating species at tiny bays which fisherman use as shelters and small harbours.

Due to the sea water temperature and salinity, some other algae which can easily survive at different coastal line of Turkey, are not observed at these stations. In contrast, fresh water taxa forms of (*Cladophora glomerata* var. *glomerata*, *Enteromorpha prolifera* subsp. *prolifera*) are found at these stations.

Table 2: A comparison, in terms of number of algae species between Giresun and remaining provinces of the region (KR: Kırklareli, KSD: Kocaeli, Sakarya, Düzce, ZN: Zonguldak, BR: Bartın, KS: Kastamonu, SN: Sinop, SM: Samsun OR: Ordu, TR: Trabzon, RA: Rize-Artvin).

Division	Studied Cities of Turkish Black Sea Shores										
	KR	KSD	ZN	BR	KS	SN	SM	OR	GR	TR	RA
<i>Cyanophyta</i> (Cy)	23	30	20	12	22	22	20	14	18	1	3
<i>Rhodophyta</i> (R)	71	126	100	116	133	136	106	93	109	23	43
<i>Ochrophyta</i> (O)	24	50	42	43	56	52	27	27	33	8	15
<i>Chlorophyta</i> (C)	30	46	43	39	48	55	22	26	30	23	27
<i>Magnoliophyta</i>	3	3	3	3	3	3	3	4	3	3	3
Total	151	255	208	213	262	268	178	164	193	58	91

A comparison in terms of number of algae species between Giresun and remaining provinces of the region is listed in Table 2 and rates of dominance is given in table 3.

R/C and R/O rates at Giresun coast, such as other provinces of the Black Sea of Turkey, are also higher than Aegean and Mediterranean coasts. The close results of the study in terms of O/CY and C/CY rates points the attention paid on to blue-green bacterias.

The numbers of taxa periodically increases from west to east until Sinop (Table 2). The number then decreases in Samsun, but increases again in Giresun, which is the following station. According to Güner and Aysel (1996), this can be the result of the interior currents of Black Sea.

The strong current of Mediterranean carries the algae spores through the Aegean Sea, Dardanelles, the Marmara Sea and Bosphorus to the Black Sea. This current changes its direction towards the Azak Sea. A following current from Azak Sea to Ukraine, Rumania, Bulgaria, Thrace (Turkey) is combined to another one coming through Bosphorus. All these currents help the circulation of algae and stand as a major factor for the attendance of algae at the Black Sea. Smaller circulated flows at the east of Sinop play an important role for the marine algal flora. These smaller flows get back to Sinop after completing their circle from Caucasia Eastern Azak Sea. In addition, these smaller flows play a limited role in algal variety of the region. This issue is also observed at the decreasing numbers of taxa numbers from west to east.

Biological diversity of the Black Sea coast has decreased in recent years due to on going high way construction following the coastal line. As a result of the increasing pollution and worse environmental factors effects, Giresun must be declared as sit area as soon as possible such as the rest of all the Black Sea coastal line, to protect its biological variety.

Finally, owing human and/or industrial sourced pollution and the geographic structure of the Black Sea flora, is badly affected. The filling up of the coast to build up a road all the way along the Black Sea also has an additional negative effect on the sea flora. Therefore, economical

species which are valuable for Turkey and other countries are facing the danger of disappearance.

Table 3: Dominancy in division level among northeastern provinces of Turkey

Division	Dominancy as cities in division level from the Black Sea Shores of Turkey										
	GR	KR	KSD	ZN	BR	SN	KS	SM	OR	TR	RA
R/O	3,30	3	2,52	2,4	2,7	2,60	2,37	3,92	3,44	2,9	2,9
R/C	3,63	3,7	2,73	2,3	3	2,50	2,77	4,81	3,58	1	1,6
R/CY	6,05	3,1	4,2	5	9,7	6,50	6,04	4,3	6,64	23	14,3
O/C	1,1	0,8	1,08	1	1,1	0,96	1,16	1,22	1,04	0,3	0,6
O/CY	1,83	1	1,66	2,1	3,6	2,50	2,54	1,35	1,93	8	5
C/CY	1,66	1,3	1,53	2,2	3,3	2,59	2,18	1,1	1,86	23	9

As seen in table 3, blue-green bacteria are becoming rare at Rize and Artvin provinces. We believe these two provinces should be revived in terms of general algal flora.

Özet

Bu araştırmada, Giresun (Karadeniz, Türkiye) sahillerinin üst infralittoralinde yayılış gösteren deniz algleri ve deniz çayırları çalışılmıştır. Mavi-yeşil bakterilerden (*Cyanophyta*) 18, kırmızı alglerden (*Rhodophyta*) 109, kahverengi alglerden (*Ochrophyta*) 33, yeşil alglerden (*Chlorophyta*) 30 ve deniz çayırlarından (*Magnoliophyta*) 3 olmak üzere toplam 193 takson tayin edilmiştir. *Erythrotrichia investiens*, *E. vexillaris*, *Lophosiphonia scopulorum* ve *Spermothamnion repens* var. *flagelliferum* Türkiye Karadeniz kıyıları için yeni kayıttır.

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Marine Algae and Seagrasses of Antalya Shore

(Mediterranean, Turkey)

Antalya Kıyılarındaki Deniz Algleri ve Deniz Çayırları

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Abstract

In this study, the upper infralittoral zone of Antalya (Turkish Mediterranean coasts) was researched. 375 algae and five seagrasses were determined. There are (36 taxon) blue-green algae (*Cyanophyceae*), (198 taxon) red algae [*Rhodellophyceae* (1), *Compsopogonophyceae* (2), *Bangiophyceae* (5), *Florideophyceae* (190)], (74 taxon) brown algae (*Fucophyceae*), (67 taxon) green algae [*Chlorophyceae* (4), *Ulvophyceae* (18), *Cladophorophyceae* (23), *Bryopsidophyceae* (20), *Dasycladophyceae*(2)] and (5 taxon) seagrasses (*Liliopsida*). *Bonnemaisonia clavata* G. Hamel (*Rhodophyceae*) was given as new record for the Turkish Marines. *Leibleinia epiphytica* (Hieronymus) Anagnostidis & Komárek, *Microchaete grisea* Thuret, *Calothrix scopulorum* (Weber van Bosse & Mohr) C. Agardh (*Cyanophyceae*), *Gelidiocolax christinae* J. Feldman et G. Feldman, *Falkenbergia hildenbrandii* (Bornet) Falkenberg, *Hydrolithon farinosum* var. *chalicodictyum* (W.R. Taylor) Serio, *Acrodiscus vidovichii* (Meneghini) Zanardini, *Ceramium codii* (Richards) Feldmann Mazoyer, *Chondria mairei* Feldmann Mazoyer, *Polysiphonia paniculata* Montagne (*Rhodophyceae*) and *Ulva curvata* (Kützting) De Toni (*Ulvophyceae*) were given as new record for the Turkish coasts of Mediterranean.

Key Words: Blue-green algae, red algae, brown algae, green algae, seagrasses, Antalya, Mediterranean, Turkey. * e-mail: eyalinsu@yahoo.com

Introduction

The first investigations of the Turkish Mediterranean algae were carried out by Öztüğ (1957). Followed by the contribution from Karamanoğlu (1964), Additionally Apaydın *et al.* (2002) published a new record for The Algal Flora of Turkey: *Chaetomorpha crassa* (C. Agardh) Kützing (Cladophoraceae, Chlorophyceae). Aysel and Gezerler-Şıpal (1996) published the check liste of *Cyanophyceae*, *Chlorophyceae*, *Charophyceae* and *Angiospermae* of Turkish Mediterranean coasts. Aysel (1997a, b) studied the check liste of *Rhodophyta*, *Fucophyceae* and *Phaeophyceae* of Turkish Mediterranean coasts. Patara- Kalkan was investigated by Aysel *et al.* (1998). Aysel *et al.* (2002) published a new record for The Algal Flora of Turkey: *Caulerpa scalpelliformis* (R. Brown ex Turner) C. Agardh var. *denticulata* (Dacaisne) Weber van Bosse (*Caulerpanceae*, *Caulerpales*). Muğla was investigated Aysel *et al.* (2003). Aysel *et al.* (2005a,b,c) studied on distribution of marine macro algae on Adana, Hatay and Mersin shores. Cirik studied distribution of marine algae on Akkuyu costs in 1986 and 1991. Cirik & Öztürk (1991) published about *Caulerpa racemosa* that distribution on Turkish Mediterranean coast. Ertan *et al.* published a new record for The Algal Flora of Turkey; *Caulerpa scalpelliformis* (Brown ex Turner C. Agardh (*Caluerpaceae*, *Chlorophyceae*) in 1998. Everset *et al.* (1997) invastigated macroscopic marine algae from İskenderun Bay. Öztürk investigated distribution of *Cutleriales*, *Sphacelariales*, *Scytosiphonales*, *Dictyotales* (1988), and *Chordariales*, *Sporochnales* (1993), *Fucales* (1996a) and *Punctariales* (1996b) on Aegean Sea and Turkish Mediterranean coast. Öztürk and Güner (1986) studied on *Ectocarpales* (*Phaeophyta*) on Aegean Sea and Turkish Mediterranean coast., Taşkın *et al.* (2000a,b) investigated distribution of *Rhodophyta*, *Cyanophyceae* and *Chlorophyceae* on İskenderun gulf (Hatay coast). Taşkın *et al.* (2001) published three new record for The Algal Flora of Turkey. Turna *et al.* (2000a) were published a new record for The Algal Flora of Turkey; *Botryocladia madagascariensis* G. Feldmann (*Rhodymeniaceae*, *Rhodophyceae*). Turna *et al.* (2000b) studied on distribution of *Chlorophyta* on Antalya bay. Turna *et al.* (2002) studied on seasonal Variations in the Biomass of Macro-Algal Communities from the

Gulf of Antalya. Turna *et al.* (2003) investigated distribution of Brown algae and Red algae on Antalya bay (Mediterranean). Yağcı & Turna (2002) published a new record for The Algal Flora of Turkey; *Chaetomorpha crassa* (C.Agardh) Kützing (*Cladophoraceae*, *Chlorophyceae*).

Material and Methods

Collected specimens were fixed using 4 % formaldehyde. Specimens belonging to *Rhodomelaceae* and *Corallinaceae* were exceptionally treated with 10 % HCl in identification procedures for specific cell wall properties. Antalya is situated between 29° 16' 23" and 32° 33' 42" eastern longitudes (Figure 1).



Figure 1: Map of Antalya coastline

The distribution of algae on the Turkish marin that new recorded for the Turkish coasts of Mediterranean is given in Figure 3 [Artvin (1), Rize (2), Trabzon (3), Giresun (4), Ordu (5), Samsun (6), Sinop (7), Kastamonu (8), Bartın (9), Zonguldak (10), Düzce (11), Sakarya (12), Kocaeli (13), İstanbul (14), Kırklareli (15), Tekirdağ (16), Edirne (17), Çanakkale (18), Balıkesir (19), Bursa (20), Yalova (21), Gökçeada (22), Bozcaada (23), İzmir (24), Aydın (25), Muğla (26), Antalya (27), Mersin (28), Adana (29), Hatay (30)].

Results

Taxa distributed in study area are listed in Table 1. In this list, classes and upper categories were arranged according to Van den Hoek *et al.* (1997) and Guiry and Dohnncha (2005). Arrangement of lower categories, presented in the list were followed by specialists [(Silva *et al.* (1996) for *Cyanophyta* and *Rhodophyta*, Stegenga (1985) for *Acrochaetiales*, Frederic and Hommersand (1989) for *Gracilariales*, Bressan and Babbini-Benussi (1995, 1996) for *Corallinales*, Gomez Garreta *et al.* (2001) for *Ceramiales*, Ribera *et al.* (1992) for *Fucophyceae*, Gallardo *et al.* (1993) for *Chlorophyceae*]. Additionally, the studies of Barbara and Cremades (1996), Ballantine and Aponte (1997) and Hardy and Guiry (2003) were used to create an evolutionary list of taxa above genus level. Taxa in species or below species level are listed alphabetically. New records for the Turkish Marines (**) and the Turkish coasts of Mediterranean (*) are indicated with asteriks.

Table 1: Taxa distributed on Antalya (Mediterranean) coasts of Turkey. (**): Türkish marines, (*): Turkish coasts of Mediterranean.

CYANOPHYTA [=CYANOBACTERIA]	Foslie) Silva
CYANOPHYCEAE	MERISMOPEDIACEAE
CHROOCOCCALES	GOMPHOSPHAERIOIDEAE
CHROOCOCCACEAE	<i>Gomphosphaeria aponina</i> Kützing
<i>Chroococcus dimidiatus</i> (Kützing) Nägeli	MERISMOPEDIOIDEA
<i>C. minor</i> (Kützing) Nägeli	<i>Aphanocapsa litoralis</i> Hansgirg
<i>C. minutus</i> (Kützing) Nägeli	(= <i>Microcystis halophila</i> B. Martens & Pankow)
DERMOCARPACEAE	OSCILLATORIALES
<i>Dermocarpa acervata</i> (Setchell & Gardner) Pham Hoàng Hô	OSCILLATORIACEAE
<i>D. schousboei</i> (Thuret) Bornet	<i>Leptolyngbya foveolarum</i> (Montagne ex Gomont)
HYELLACEAE	Anagnostidis & Komárek
<i>Pleurocapsa crepidinum</i> Collins	<i>Lyngbya adriae</i> Ercégovic
MICROCYSTACEAE	<i>L. agardhii</i> (P.L. Crouan & H.M. Crouan) Gomont
<i>Gloeocapsa crepidinum</i> Thuret	<i>L. confervoides</i> C. Agardh
<i>Microcystis marina</i> (Hansgrig in	<i>L. majuscula</i> (Dilliwyn) Harvey

L. polychroa (Meneghini)
Rabenhorst
Oscillatoria margaritifera Kützing
ex Gomont
O. miniata (Zanardini) Gomont

PHORMIDIOIDEAE

Phormidium autumnale C. Agardh
(Gomont)
P. limosum (Dillwyn) P.C. Silva
P. subfuscum Kützing ex Gomont

SPIRULINOIDEAE

Spirulina subsalsa Oersted

PSEUDOANABAENACEAE

Spirocoleus tenuis (Meneghini)
Silva

HETEROLEIBLEINIOIDEAE

Heteroleibleinia infixa (Frémy)
Anagnostidis & Komárek

LEPTOLYNGBYOIDEAE

Leibleinia baculum (Gomont)
Hoffmann
**L. epiphytica* (Hieronymus)
Anagnostidis & Komárek
L. williei (Setchell & Gardner) Silva

SCHIZOTRICHACEAE

Schizothrix lacustris (Braun)
Gomont

NOSTOCALES

MICROCHAETACEAE

MICROCHAETOIDEAE

**Microchaete grisea* Thuret

RIVULARIACEAE

Calothrix aeruginosa (Kützing)
Thuret
C. contarenii (Zanardini) Bornet &
Flahault

C. parasitica (Chauvin) Thuret
**C. scopulorum* (Webervan Bosse
& Mohr) C. Agardh
C. thermalis (Schwabe) Hasngirg
Isactis plana (Harvey) Thuret ex
Bornet & Flahault
Rivularia atra Roth ex Bornet &
Flahault

RHODOPHYTA

RHODELLOPHYTINA

RHODELLOPHYCEAE

STYLONEMATALES

STYLONEMATAACEAE

Stylonema alsidii (Zanardini)
K. Drew

COMPSOPOGONOPHYCEAE

ERYTHROPELTIDALES

ERYTHROTRICHIACEAE

Erythrotrichia carnea (Dillwyn)
J. Agardh

Sahlbingia subintegra (Rosenvinge)
Kornmann

MACRORHODOPHYTINA

BANGIOPHYCEAE

BANGIOPHYCIDAE

GONIOTRICHIALES

GONIOTRICHACEAE

Chroodactylon ornatum
(C. Agardh) Basson

BANGIALES

BANGIACEAE

Bangia atropurpurea (Roth)

C. Agardh

Porphyra leucosticta Thuret in
Le Jolis

f. *leucosticta*

P. minor Zanardini

P. umbilicalis (Linnaeus) Kützing

FLORIDEOPHYCEAE
HILDENBRANDIOPHYCIDAE
HILDENBRANDIALES
HILDENBRANDIACEAE
Hildenbrandia rubra (Sommerfelt)
Meneghini

NEMALIOPHYCIDAE
ACROCHAETIALES
ACROCHAETIACEAE
Acrochaetium crassipes (Børgesen)
Børgesen
A. hallandicum (Kyllin) Hamel
A. mediterraneum (Levring)
Boudouresque
A. microscopicum (Nägeli ex
Kützing) Nägeli
A. parvulum (Kyllin) Hoyt
A. rosulatum (Rosenvinge)
Papenfuss
A. savianum (Meneghini) Nägeli
A. secundatum (Lyngbye) Nägeli
A. virgatulum (Harvey) Batters

COLACONEMATALES
COLACONEMATACEAE
Colaconema codicola (Børgesen)
Stegenka, Bolton & Anderson
C. daviesii (Dillwyn) Stegenga

NEMALIALES
GALAXAURACEAE
Scinaia furcellata (Turner)
J. Agardh
Tricleocarpa cylindrica (Ellis
& Solander) Huisman &
Borowitzka
T. fragilis (Linnaeus) Huisman &
Townsend

LIAGORACEAE
Ganonema farinosum (Lamouroux)
Fan & Wang
Liagora distenta (Mertens ex Roth)

Lamouroux
L. viscida (Forsskål) C. Agardh

NEMALIACEAE
Nemalion helminthoides (Velley)
Batters

RHODYMENIOPHYCIDAE
GELIDIALES
GELIDIACEAE
Gelidium affine Schifferner
G. corneum (Hudson) Lamouroux
var. *pectinatum* Ardissonne &
Strafforello
G. crinale (Hare ex Turner) Gaillon
var. *crinale*
G. pulchellum (Turner) Kützing
G. pusillum (Stackhouse) Le Jolis
var. *pusillum*
G. spathulatum (Kützing) Bornet
G. spinosum (Gmelin) Silva
var. *spinosum*
var. *hystrix* (J. Agardh) Furnari
var. *luxurans* (P.L. et H.M.
Crouan) nov. nomen
Pterocladia capillacea (Gmelin)
Santelices & Hommersand
f. *capillacea*

GELIDIELLACEAE
Gelidiella lubrica (Kützing)
Feldmann & Hamel
G. nigrescens (Feldmann) Feldmann
& Hamel
G. ramellosa (Kützing) Feldmann
& Hamel
Parviphycus antipai (Celan)
Santelices
P. tenuissimus (Feldmann &
Hamel) Santelices

GRACILARIALES
GRACILARIACEAE
Gracilaria bursapastoris (Gmelin)

Silva
G. gracilis (Stackhouse) Steentoft,
Irvine & Farnham
var. *gracilis*

PTEROCLADIOPHILACEAE
**Gelidiocolax christinae* J. Feldman
et G. Feldman IL, M

BONNEMAISONIALES
BONNEMAISONIACEAE
***Bonnemaisonia clavata* G. Hamel
**Falkenbergia hildenbrandii*
(Bornet) Falkenberg
F. rufolanosa (Harvey) Schmitz
Trailliella intricata Batters

CORALLINALES
CORALLINACEAE
AMPHIROIDEAE
Amphiroa beauvoisii Lamouroux
A. cryptarthrodia Zanardini
A. rigida Lamouroux

CHOREONEMATOIDEAE
Choreonema thuretii (Bornet)
Schmitz

CORALLINOIDEAE
CORALLINEAE
Corallina elongata Ellis & Solander
C. panizzoi Schnetter & U. Richter
C. pinnatifolia (Manza) Dawson

JANIEAE
Haliptilon roseum (Lamarck)
Garbary & Johansen
var. *roseum*
H. squamatum (Linnaeus)
Johansen, Irvine & Webster
H. virgatum (Zanardini) Garbary &
Johansen
Jania adhaerens J.V. Lamouroux
J. longifurca Zanardini

J. rubens (Linne) Lamouroux
var. *rubens*
var. *corniculata* (Linnaeus) Yendo

MASTOPHOROIDEAE
Hydrolithon farinosum
(Lamouroux) D. Penrose &
Chamberlain
var. *farinosum*
* var. *chalicodictyum*
(W.R. Taylor) Serio

LITHOPHYLLOIDEAE
Lithophyllum cystoseirae (Hauck)
Heydrich
L. tortuosum (Esper) Foslie
f. *tortuosum*
f. *undulosum* (Bory de
Saint-Vincent) *nov. comb.*
Titanoderma pustulatum
(Lamouroux) Nägeli

MELOBESIOIDEAE
Melobesia membranacea (Esper)
Lamouroux sensu Chanberline &
Irvine
Mesophyllum expansum
(Philippi) Cabioch & Mendoza
M. lichenoides (Ellis) Lemoine
Phymatolithon lenormandii
(Areschoug) Adey

GIGARTINALES
ACROSYMPHYTACEAE
Acrosymphyton purpuriferum
(J. Agardh) Sjøstedt

CALOSIPHONACEAE
Calosiphonia vermicularis
(J. Agardh) Schmitz

DUMONTIACEAE
Dudresnaya verticillata (Withering)
Le Jolis

FURCELLARIACEAE

Halarachnion ligulatum
(Woodward) Kützing

GIGARTINACEAE

Chondracanthus acicularis (Roth)
Fredericq

HYPNEACEAE

Hypnea divaricata (C. Agardh)
Greville
H. musciformis (Wulfen in Jaquin)
Lamouroux

KALLYMENIACEAE

Kallymenia requienii (J. Agardh) J.
Agardh
Meredithia microphylla (J. Agardh)
J. Agardh

PEYSSONNELICEAE

Metapeyssonnelia feldmannii
Boudouresque, Coppejans &
Marcot
Peyssonnelia bornetii
Boudouresque & Denizot
P. coriacea Feldmann
P. crispata Boudouresque &
Denizot
P. rubra (Greville) J. Agardh
P. squamaria (Gmelin) Decaisne

PHYLLOPHORACEAE

Gymnogongrus palmettoides
(J. Agardh) Ardissonne
Phyllophora crispa (Hudson) Dixon
f. *crispa*
P. sicula (Kützing) Guiry & Irvine

RHABDONIACEAE

Catenella caespitosa (Withering)
Irvine in Parke & Dixon

NEMASTOMACEAE

Nemastoma dichotomum J. Agardh

SCHIZYMENIACEAE

Platoma cyclocalpa (Montagne)
Schmitz

SPHAEROCOCCACEAE

Sphaerococcus coronopifolius
Stackhouse

WURDEMANNIACEAE

Wurdemannia miniata (Sprengel)
Feldmann & Hamel

RHODYMENIALES

RHODYMENIACEAE

Botryocladia botryoides (Wulfen)
Feldmann
B. chiajeana (Meneghini) Kylin
B. madagascariensis G. Feldmann
B. microphysa (Hauck) Kylin
Chrysymenia ventricosa
(Lamouroux) J. Agardh
Rhodymenia ardissoni J. Feldmann
var. *ardissoni*
var. *spathulata* (Schiffner) nov.
comb.
R. ligulata Zanardini
R. pseudopalmata (Lamouroux)
Silva

CHAMPIACEAE

Champia parvula (C. Agardh)
Harvey
Chylocladia verticillata (Lightfoot)
Bliding

LOMENTARIACEAE

Lomentaria articulata (Hudson)
Lyngbye
var. *articulata*
L. clavellosa (Turner) Gaillon

HALYMENIALES

GRATELOUPIACEAE

Grateloupia dichotoma J. Agardh
G. filicina (Lamouroux) C. Agardh
G. prolongata J. Agardh

HALYMENIACEAE

**Acrodiscus vidovichii* (Meneghini)
 Zanardini IL, CL, M
Halymenia floresii (Clemente
 Rubio) C. Agardh

PLOCAMIALES

PLOCAMIACEAE

Plocamium cartilagineum Linnaeus
 (Dixon)

CRYPTONEMIALES

CRYPTONEMACEAE

Cryptonemia lomation (Bertoloni)
 J. Agardh

CERAMIALES

CERAMIACEAE

CALLITHAMNIOIDEAE

CALLITHAMNIEAE

Aglaothamnion caudatum
 (J. Agardh) Feldmann Mazoyer
A. hookeri (Dilliwyn) Maggs
 & Hommersand
A. tenuissimum (Bonnemaison)
 Feldmann Mazoyer
 var. *tenuissimum*
Callithamnion corymbosum (Smith)
 Lyngbye
C. granulatum (Ducluzeau)
 C. Agardh

GYMNOTHAMNIEAE

Gymnothamnion elegans
 (Schousboe ex C. Agardh)
 J. Agardh

CERAMOIDEAE

ANTITHAMNIEAE

Antithamnion cruciatum
 (C. Agardh) Nägeli
 var. *cruciatum*

CERAMIEAE

Ceramium ciliatum (Ellis)
 Ducluzeau
 var. *ciliatum*
 var. *robustrum* (J. Agardh)
 Mazoyer
C. circinatum (Kützting) J. Agardh
 **C. codii* (Richards)
 Feldmann Mazoyer
C. deslongchampsii Chauvin
 ex Duby
C. flaccidum (Kützting) Ardissonne
C. rubrum auctorum
 var. *rubrum*
C. siliquosum (Kützting) Maggs &
 Hommersend
 var. *siliquosum*
 var. *elegans* (Roth) Furnari
C. tenerrimum (G. Martens)
 Okamura
 var. *tenerrimum*
 var. *brevizonatum* (Peterson)
 Feldmann Mazoyer
Centroceras clavulatum
 (C. Agardh) Montagne

CROUANIEAE

Crouania attenuata (C. Agardh)
 J. Agardh

GRIFFITHSIEAE

Anotrichium barbatum (C. Agardh)
 Nägeli
A. tenue (C. Agardh) Nägeli
Griffithsia devoniensis Harvey
G. phyllamphora J. Agardh
G. schousboei Montagne
 var. *schousboei*

PTEROTHAMNIEAE
Pterothamnion plumula (Ellis)
 Nägeli

SPYRIDIEAE
Spyridia filamentosa (Wulfen)
 Harvey in W.J. Hooker

WRANGELIEAE
Wrangelia penicillata (C. Agardh)
 C. Agardh

COMPSOTHAMNIOIDEAE
 COMPSOTHAMNIEAE
Compsothamnion thuyoides (J.E. Smith) Schmitz

SPERMOTHAMNIEAE
Lejolisia mediterranea Bornet
Ptilothamnion pluma (Dillwyn)
 Thuret
Spermothamnion flabellatum Bornet

SPONGOCLONIEAE
Pleonosporium borrieri (J.E. Smith)
 Nägeli

DASYACEAE
Dasya corymbifera J. Agardh
D. hutchinsiae Harvey in W.J. Hooker
D. punicea (Zanardini) Meneghini
 ex Zanardini
D. rigidula (Kützing) Ardissonne
Heterosiphonia crispella
 (C. Agardh) Wynne

HYPOGLOSSEAE
Hypoglossum hypoglossoides
 (Stackhouse) Collins & Harvey

NITOPHYLLOIDEAE
 NITOPHYLLEAE
Nitophyllum punctatum (Stackhouse)

Greville
 var. *punctatum*
Radicilingua thysanorhizans
 (Holmes) Papenfuss

PHYCODYOIDEAE
 CRYPTOPLEUREAE
Acrosorium ciliolatum (Harvey)
 Kylin

RHODOMELACEAE
 AMANSIEAE
Halopithys incurva (Hudson)
 Batters
Osmundaria volubilis (Linnaeus)
 R.E. Norris
Rytiphlaea tinctoria (Clemente)
 C. Agardh

CHONDRIEAE
Acanthophora nayadiformis
 (Delilei) Papenfuss
Chondria capillaris (Hudson)
 Wynne
 var. *capillaris*
C. dasyphylla (Woodward)
 C. Agardh
 **C. mairei* Feldmann Mazoyer

LAURENCIEAE
Chondrophycus paniculatus
 (C. Agardh) Furnari
C. papillosus (C. Agardh) Garbary
 & J. Harper
Erythrocytis montagnei (Derbès & Solier) Silva
Laurencia glandulifera (Kützing)
 Kützing
L. obtusa (Hudson) Lamouroux
 var. *obtusa*
 var. *gracilis* (Kützing) Hauck
 var. *laxa* (Kützing) Ardissonne
L. pyramidalis Bory
 de Saint-Vincent ex Kützing

Osmundea pelagosae (Schiffner)
Nam
Rodriguezella strafforelloi Schmitz
ex J.J.Rodriguez
var. *crassicaulis* Ercegovic

POLYSIPHONIEAE

Alsidium corallinum C. Agardh
A. helminthochorton
(Schwendimann) Kützing
Digenea simplex (Wulfen)
C. Agardh
Herposiphonia secunda
C. Agardh) Ambronn
f. *secunda*
f. *tenella* (C. Agardh) Wynne
Lophocladia lallemandii
(Montagne) Schmitz
Lophosiphonia cristata Falkenberg
L. obscura (C. Agardh) Falkenberg
L. scopulorum (Harvey) Womersley
L. subadunca (Kützing) Falkenberg
Polysiphonia atra Zanardini
P. elongata (Hudson) Sprengel
P. kellneri Zanardini
P. opaca (C. Agardh) Moris &
De Notaris
**P. paniculata* Montagne
P. sanguinea (C. Agardh) Zanardini
P. sertularioides (Grateloup)
J. Agardh
P. tenerima Kützing
P. tripinnata J. Agardh
P. variegata (C. Agardh) Zanardini

POLYZONIEAE

Dipterosiphonia rigens (Shousboei)
Falkenberg

PTEROSIPHONIEAE

Pterosiphonia pennata (C. Agardh)
Sauvageau

OCHROPHYTA

[=HETEROKONTOPHYTA]

FUCOPHYCEAE

ECTOCARPALES

ECTOCARPACEAE

Ectocarpus siliculosus (Dillwyn)

Lyngbye

var. *siliculosus*

E. virescens Thuret ex Sauvageau

Feldmannia caespitula (J. Agardh)

KnoepfflerPéguy

var. *caespitula*

var. *lebelii* (Areschoug ex

P.L. Crouan) Knoepffler Péguy

F. irregularis (Kützing) Hamel

F. globifera (Kützing) Hamel

F. padinae (Buffham) Hamel

Hinckia mitchelliae (Harvey) Silva

Streblonema sphaericum (Derbès &
Solier) Thuret

CHORDARIALES

MYRIONEMATACEAE

Myrionema strangulans Greville

ELACHISTACEAE

Halothrix lumbricalis (Kützing)

Reinke

LEATHESIACEAE

Leathesia mucosa Feldmann

CORYNOPHLAEACEAE

Corynophlaea umbellata

(C. Agardh) Kützing

Myriactula arabica (Kützing)

Feldmann

M. rivulariae (Shur) Feldmann

SPERMATOCHNACEAE

Spermatochnus paradoxus (Roth)

Kützing

Stilophora tenella (Esper) Silva

CHORDARIACEAE

Cladosiphon mediterraneus
Kützing
Liebmannia leveillei J. Agardh
Sphaerotrichia divaricata
(C. Agardh) Kylin

RALFSIALES

RALFSIACEAE

Hapalospongidion macrocarpum
(Feldmann) León Álvarez
& González
Ralfsia verrucosa (Areschoug)
Areschoug

CUTLERIALES

CUTLERIACEAE

Cutleria chilosa (Falkenberg) Silva
C. multifida (Turner) Greville
Zanardinia typus (Nardo) Furnari

SPHACELARIALES

SPHACELARIACEAE

Sphacelaria cirrosa (Roth)
C. Agardh
f. *cirrosa*
f. *mediterranea* Sauvageau
S. fusca (Hudson) S.F. Gray
S. rigidula Kützing
S. tribuloides Meneghini

STYPOCAULACEAE

Halopteris filicina (Grateloup)
Kützing
H. scoparia Linnaeus Sauvageau

CLADOSTEPHACEAE

Cladostephus spongiosus (Hudson)
C. Agardh
f. *verticillatus* (Lightfoot)
Prod'homme van Reine

DICTYOTALES

DICTYOTACEAE

Dictyopteris polypodioides
(De Candolle) Lamouroux
Dictyota dichotoma (Hudson)
Lamouroux
var. *intricata* (C. Agardh)
Greville
D. fasciola (Roth) Lamouroux
var. *fasciola*
var. *repens* (J. Agardh) Ardissonne
D. linearis (C. Agardh) Greville
f. *linearis*
D. mediterranea (Schiffner) Furnari
var. *mediterranea*
var. *crassa* (Schiffner) V Aysel,
H Erduğan, EŞ Okudan, H Erk
D. menstrualis (Hoyt) Schnetter,
Hornig & WeberPeukert
var. *menstrualis*
D. spiralis Montagne
Padina pavonica (Linnaeus) Thivy
Stypopodium schimperi (Buchinger
ex Kützing) Verlaque &
Boudouresque
Taonia atomaria (Woodward)
J. Agardh
f. *atomaria*
f. *ciliata* (C. Agardh)
Nizamuddin
Zonaria tournefortii (Lamouroux)
Montagne

DICTYOSIPHONALES

MYRIOTRICHIAEAE

Myriotrichia claviformis Harvey

GIRAUDIACEAE

Giraudia sphacelarioides Derbès
& Solier

ASPEROCOCCACEAE

Asperococcus bullosus Lamouroux
f. *bullosus*
A. fistulosus (Hudson) W.J. Hooker

PUCTARIALES
 PUNCTARIACEAE
Punctaria latifolia Greville

SCYTOSIPHONALES
 COLPOMENIACEAE
Colpomenia sinuosa (Mertens ex
 Roth) Derbès & Solier
Hydroclathrus clathratus
 (C. Agardh) Howe

SCYTOSIPHONACEAE
Petalonia fascia (Müller) Kuntze
Scytosiphon simplicissimus
 (Clemente) Cremades
 var. *simplicissimus*

FUCALES
 CYSTOSEIRACEAE
Cystoseira amentacea Bory
 var. *amentacea*
 var. *stricta* Montagne
C. barbata (Stackhouse) C. Agardh
 var. *barbata*
C. compressa (Esper) Gerloff &
 Nizamuddin
 f. *compressa*
C. corniculata (Turner) Zanardini
 var. *corniculata*
C. crinita (Desfontaines) Bory
 f. *crinita*
C. crinitophylla Ercégovic
C. dubia Valiante
C. elegans Sauvageau
C. foeniculacea (Linnaeus) Greville
C. humulis Schousboe ex Kützing
 var. *humulis*
C. mediterranea Sauvageau
 var. *mediterranea*
 var. *valiantei* Sauvageau
C. spinosa Sauvageau
C. squarrosa De Notaris

SARGASSACEAE

Sargassum acinarum (Linnaeus)
 Setchell
S. hornschurchii C. Agardh
S. vulgare C. Agardh
 var. *vulgare*

CHLOROPHYTA
 CHLOROPHYTINA
 TETRASPOROPHYTAE
 CHLOROPHYCEAE
 PHAEOPHILALES
 PHAEOPHILACEAE
Phaeophila dendroides (P. L.
 Crouan & H. M. Crouan) Batters

CHLOROCOCCALES
 ENDOSPHAERACEAE
Gomontia polyrhiza (Leigerheim)
 Bornet & Flahault

CHAETOPHORALES
 CHAETOPHORACEAE
Bolbocoleon piliferum Pringsheim
Entocladia viridis Reinke

ULVOPHYCEAE
 ULVOPHYCEAE
 ULOTRICHALES
 BORODINELLACEAE
Planophila microcystis (Dangeard)
 Kornmann & Sahling

ULOTRICHACEAE
Ulothrix zonata (Weber & Mohr)
 Kützing

ULVALES
 ULVACEAE
Enteromorpha clathrata (Roth)
 Greville
E. compressa (Linnaeus) Nees
 var. *compressa*
E. flexuosa (Wulfen) J. Agardh
 subsp. *flexuosa*

E. intestinalis (Linnaeus) Nees
var. *intestinalis*
E. kylinii Bliding
E. linza (Linnaeus) J. Agardh
var. *linza*
E. muscoides (Clemente) Cremades
E. prolifera (Müller) J. Agardh
subsp. *prolifera*
E. usneoides Bonnemaison ex
J. Agardh
**Ulva curvata* (Kützing) De Toni
U. fasciata Delile
U. rigida C. Agardh
f. *rigida*
U. taeniata (Setchell) Setchell
& Gardner

ULVELLACEAE

Acrochaete repens Pringsheim
Epicladia flustrae Reinke
Ulvella lens P. L. Crouan & H. M.
Crouan

CLADOPHOROPHYCEAE

CLADOPHOROPHYCEAE

CLADOPHORALES

ANADYOMENACEAE

Anadyomene stellata (Wulfen)
C. Agardh

CLADOPHORACEAE

Chaetomorpha aerea (Dillwyn)
Kützing
C. crassa (C. Agardh) Kützing
C. mediterranea (Kützing) Kützing
Cladophora aegagropila (Linnaeus)
Rabenh
C. albida (Nees) Kützing
C. coelothrix Kützing
C. dalmatica Kützing
C. glomerata (Linnaeus) Kützing
var. *glomerata*
var. *marina* Lyngbye
C. hutchinsiae (Dillwyn) Kützing
C. laetevirens (Dillwyn) Kützing

C. lehmanniana (Lindenberg)
Kützing
C. mediterranea Hauck
C. oblitterata Söderström
C. pellucida (Hudson) Kützing
f. *pellucida*
C. prolifera (Roth) Kützing
C. sericea (Hudson) Kützing
C. trichotoma (C. Agardh) Kützing
Cladophoropsis modenensis
(Kützing) Børgesen
Rhizoclonium tortuosum (Dillwyn)
Kützing

SIPHONOCLADALES

VALONIACEAE

Valonia macrophysa Kützing
V. utricularis (Roth) C. Agardh

BRYOPSIDOPHYCEAE

BRYOPSIDALES

BRYOPSIDACEAE

Bryopsis corymbosa J. Agardh
B. duplex De Notaris
B. flagellata Kützing
B. hypnoides Lamouroux
var. *hypnoides*
var. *arbuscula* (De Candolle)
Schiffner
B. muscosa Lamouroux
B. plumosa (Hudson) C. Agardh
var. *plumosa*

CODIALES

CODIACEAE

Codium adhaerens C. Agardh
C. bursa (Linnaeus) C. Agardh
C. effusum (Rafinesque) Delle
Chiaje
C. fragile (Suringar) Hariot
subsp. *tomentosoides* (van Goor)
Silva

CAULERPALES

CAULERPACEAE

Caulerpa ollivieri Dostal
C. prolifera (Forsskål) Lamouroux
C. racemosa (Forsskål) J. Agardh
var. *racemosa*
var. *lamourouxii* (Turner)
Weber van Bosse
C. scalpelliformis (R. Brown ex
Turner) C. Agardh
var. *denticulata* (Dacaisne)
Weber van Bosse

UDOTEACEAE

Flabellia petiolata (Turra)
Nizamuddin
Pseudochlorodesmis furcellata
(Zanardini) Børgesen

HALIMEDALES

HALIMEDACEAE
Halimeda tuna (Ellis & Solander)
Lamouroux

DASYCLADOPHYCEAE

DASYCLADOPHYCEAE

DASYCLADALES

DASYCLADACEAE

Dasycladus vermicularis (Scopoli)
Krasser

ACETABULARIACEAE

Acetabularia acetabulum
(Linnaeus) Silva

TRACHEOPHYTA

ANGIOSPERMAE

LILIOPSIDA

CYMODOCEALES

CYMODOCEACEAE

Cymodocea nodosa (Ucria)
Ascherson

POSIDONIALES

POSIDONIACEAE

Posidonia oceanica (Linnaeus)
Delile

ZOSTERALES

ZOSTERACEAE

Zostera marina Linnaeus
Z. noltii Homermann

HYDROCHARITALES

HYDROCHARITACEAE

Halophila stipulacea (Forsskål)
Ascherson

Discussion

380 taxa (375 algae and 5 seagrasses) have been found in the present study. One of them [*Bonnemaisonia clavata* G. Hamel (*Rhodophyceae*)] is new record for the Turkish Marines (Figure 2). 11 of them [*Leibleinia epiphytica* (Hieronymus) Anagnostidis & Komárek, *Microchaete grisea* Thuret, *Calothrix scopulorum* (Weber van Bosse & Mohr) C. Agardh (*Cyanophyceae*), *Gelidiocolax christinae* J. Feldman et G. Feldman, *Falkenbergia hildenbrandii* (Bornet) Falkenberg, *Hydrolithon farinosum* var. *chalicodictyum* (W.R. Taylor) Serio, *Acrodiscus vidovichii* (Meneghini) Zanardini, *Ceramium codii* (Richards) Feldmann Mazoyer, *Chondria mairei* Feldmann Mazoyer, *Polysiphonia paniculata* Montagne

(*Rhodophyceae*) and *Ulva curvata* (Kützing) De Toni (*Ulvophyceae*) are new record for the Turkish coasts of Mediterranean. Their distribution of Turkish marines are seen Figure 3. As seen in Table 2, the comparison of the number of algal species of Antalya with those of the other Mediterranean coastal cities of Turkey was given. Species richness of *Cyanophyta* is relatively lower in provinces such as Muğla, Antalya, Mersin, Adana and Hatay. But Mersin, Adana and Hatay is having very poor a position too.

Phycologically, Antalya compared with the other cities of Mediterranean, is one of the richest provinces of southern Turkey.

Table 2: The number of algae species of Antalya and the other the Mediterranean coastal cities (AN: Antalya, AN*: (Aysel *et al.*, 1996, 1998, Aysel 1997a-b, Turna *et al* 2000a-b, 2002, 2003) MU: Muğla, MR: Mersin, AD: Adana, HT: Hatay).

Division	Studied Cities of Turkish Mediterranean Shores					
	AN	AN*	MU	MR	AD	HT
<i>Cyanophyta</i> (Cy)	36	31	40	36	27	30
<i>Rhodophyta</i> (R)	198	163	222	204	204	201
<i>Ochrophyta</i> (O)	74	71	99	82	78	73
<i>Chlorophyta</i> (C)	67	61	73	74	72	73
<i>Magnoliophyta</i>	5	5	5	5	5	5
Total	380	331	439	401	386	382

Species of *Cystoseira*, *Zanardinia* and *Dictyotaceae* are the most encountered algae along Antalya shore. *Corallina mediterranea*, *Callithamnion corymbosum*, *Ceramium siliquosum* var. *siliquosum*, *Herposiphonia secunda* f. *secunda*, *Laurencia obtusa* var. *obtusa*, *Polysiphonia sertularioides* (*Rhodophyceae*), *Ectocarpus siliculosus* var. *siliculosus*, *Feldmannia irregularis* (*Fucophyceae*), *Enteromorpha linza* var. *linza*, *E. prolifera* subsp. *prolifera*, *Ulva rigida* f. *rigida* and *Cladophora albida* (*Chlorophyta*) are common algae of the area.

As seen in Table 3, number of *Cyanophyta* species is low in Mersin, Adana and Hatay provinces. These divisions were not sufficiently investigated in these cities. Because, especially Adana and Hatay

shore are in the İskenderun Bay. This bay has been polluted by domestic or industrial pollution.

While common taxa of the seagrasses *Posidonia*, *Zostera* and *Cymodocea* are also found in Antalya shores, some algae, such as taxa of *Polysiphonia*, *Ceramium*, *Ectocarpus*, *Enteromorpha* and *Cladophora* are common. The most of this genus are found as epiphytic forms on the marine phenerogams and the other different macro algae (*Cystoseira*, *Cladostephus*, *Hypnea*, *Ulva*, *Cladophora*, *Codium* etc.).

Table 3: Dominancy in division level among southern provinces of Turkey

Division	Dominancy as cities in division level from the mediterranean shores of Turkey					
	AN	AN*	MU	MR	AD	HT
R/O	2,675	2.295	2.242	2.487	2.615	2.753
R/C	2,955	2.672	3.041	2.756	2.833	2.753
R/CY	5,500	5.258	5.550	5.666	7.555	6.700
O/C	1,104	1.163	1.356	1.108	1.083	1
O/CY	2,055	2.290	2.475	2.277	2.888	2.433
C/CY	1,861	1.967	1.825	2.055	2.666	2.433

Dominancy of taxa depending upon on provinces is summarized in Table 3. In this table, R/O values are relatively close among all provinces and changes between 2,242 and 2,753. According to these data, it can be stated out that Mediterranean shores of Turkey is not polluted heavily.



Figure 2. New records for the algal flora of Turkey (*Bonnemaisonia clavata* G. Hamel).

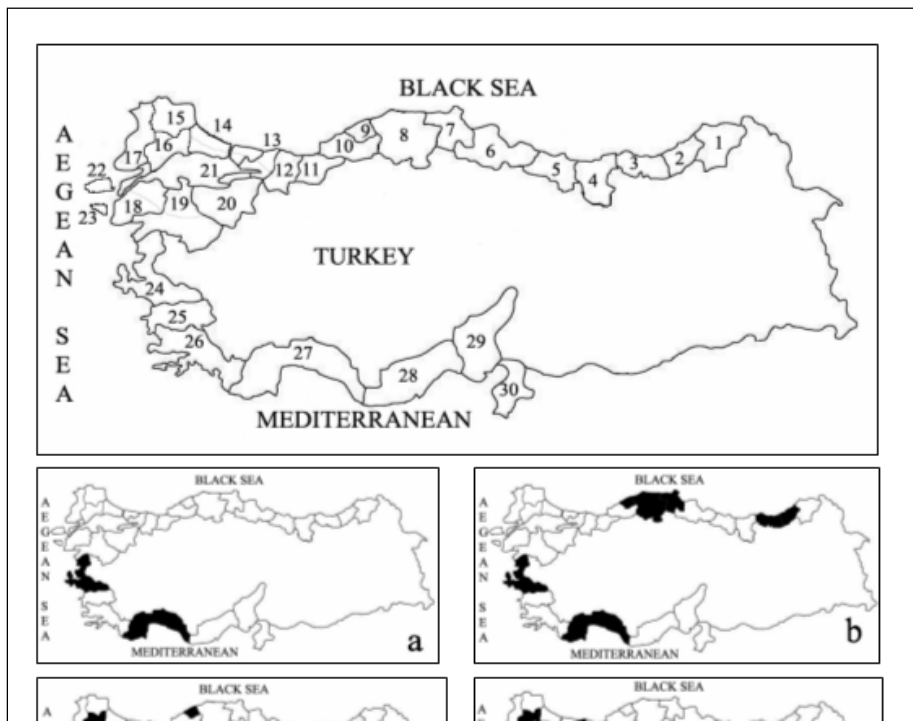


Figure 3. Distribution of algae on the Türkish marin that new recorded for the Turkish coasts of Mediterranean. *Leibleinia epiphytica* (Hieronymus) Anagnostidis & Komárek (a), *Microchaete grisea* Thuret (a), *Calothrix scopulorum* (Weber van Bosse & Mohr) C. Agardh (f), *Gelidiocolax christinae* J. Feldman et G. Feldman (h), *Falkenbergia hildenbrandii* (Bornet) Falkenberg (d), *Hydrolithon farinosum* var. *chalicodictyum* (W.R. Taylor) Serio (a), *Acrodiscus vidovichii* (Meneghini) Zanardini (a), *Ceramium codii* (Richards) Feldmann Mazoyer (g), *Chondria mairei* Feldmann Mazoyer (e), *Polysiphonia paniculata* Montagne (b), *Ulva curvata* (Kützing) De Toni (c)

Özet

Bu çalışmada Antalya'nın (Türkiye'nin akdeniz kıyıları) üst infralittoral zonu çalışılmıştır. 375 alg ve beş deniz çayırı tayin edilmiştir. Bunlar Mavi-yeşil bakteriler (36 takson) (*Cyanophyceae*), kırmızı algler (198 takson) [*Rhodellophyceae* (1), *Compsopogonophyceae* (2), *Bangiophyceae* (5), *Florideophyceae* (190)], kahverengi algler (74 takson) (*Fucophyceae*), yeşil algler (67 takson) [*Chlorophyceae* (4), *Ulvophyceae* (18), *Cladophorophyceae* (23), *Bryopsidophyceae* (20), *Dasycladophyceae*(2)] ve çiçekli bitkilerdir (5 takson) (*Liliopsida*). Bunlardan ***Bonnemaisonia clavata*** G. Hamel Türkiye denizleri için yeni kayıt olarak verilirken, ***Leibleinia epiphytica*** (Hieronymus) Anagnostidis & Komárek, ***Microchaete grisea*** Thuret, ***Calothrix scopulorum*** (Webervan Bosse & Mohr) C. Agardh, ***Gelidiocolax christinae*** J. Feldman et G. Feldman, ***Falkenbergia hildenbrandii*** (Bornet) Falkenberg, ***Hydrolithon farinosum*** var. ***chalicodictyum*** (W.R. Taylor) Serio, ***Acrodiscus vidovichii*** (Meneghini) Zanardini, ***Ceramium codii*** (Richards) Feldmann Mazoyer, ***Chondria mairei*** Feldmann Mazoyer, ***Polysiphonia paniculata*** Montagne ve ***Ulva curvata*** (Kützinger) De Toni Türkiye Akdeniz Kıyıları için yeni kayıt olarak verilmişlerdir.

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Marine Algae and Seagrasses of Mersin Shore

(Mediterranean, Turkey)

Mersin Kıyılarının Deniz Algleri ve Deniz Çayırları

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Abstract

In this research, marine algae and seagrasses were investigated in the upper infralittoral zone of Mersin (Turkish Mediterranean coasts). A total of 396 algae and 5 seagrasses were determined. 36 of them belong to blue-green algae (*Cyanophyceae*), 204 to red algae [*Rhodellophyceae* (2), *Compsopogonophyceae* (2), *Bangiophyceae* (6), *Florideophyceae*(194)], 82 to brown algae (*Fucophyceae*), 74 to green algae [*Chlorophyceae* (7), *Ulvophyceae* (19), *Trentepohliophyceae* (1), *Cladophorophyceae* (25), *Bryopsidophyceae* (20), *Dasycladophyceae* (2)] and 5 to seagrasses (*Liliopsida*).

Key Words: Blue-green algae, red algae, brown algae, green algae, seagrasses, Mersin, Mediterranean, Turkey.

Introduction

The earliest study on Turkish Mediterranean algae was performed by Öztiğ (1957), Karamanoğlu (1964), Additionally Apaydın *et al.* (2002), Aysel (1997a, b), Aysel & Gezerler- Şıpal (1996), Aysel *et*

al. (1998, 2002, 2003, 2005a,b), Cirik (1986, 1991), Cirik & Öztürk (1991), Ertan *et al.* (1998), Everest *et al.* (1997), Okudan & Aysel (2005), Öztürk (1988, 1993, 1996a, b), Öztürk & Güner (1986), Taşkın *et al.* (2000a,b 2001), Turna *et al.* (2000a,b, 2002, 2003), Yağcı & Turna (2002) who have performed floristic studies on Mediterranean coasts of Turkey

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Material and Methods

Collected specimens were fixed using 4 % formaldehyde. Specimens belonging to *Rhodomelaceae* and *Corallinaceae* were exceptionally treated with 10 % HCl in identification procedures for specific cell wall properties. Mersin is situated between $32^{\circ} 33' 42''$ and $34^{\circ} 55' 16''$ eastern longitudes (Figure 1).

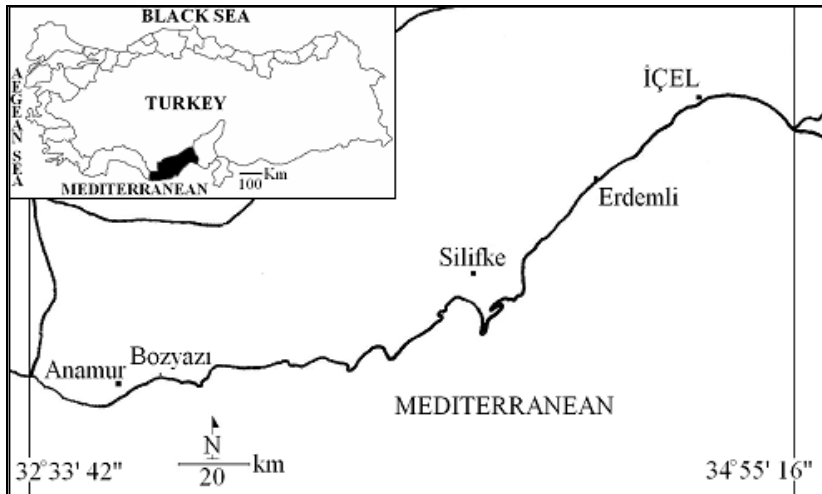


Figure 1: Map of Mersin coastline

Results

The list of the Taxa is given in Table 1. In this list, classes and upper categories were arranged according to Van den Hoek *et al.* (1997) and Guiry and Dhonncha (2005). Arrangement of lower categories, were followed by specialists [(Silva *et al.* (1996) for *Cyanophyta* and *Rhodophyta*, Stegenga (1985) for *Acrochaetiales*, Frederic and Hommersand (1989) for *Gracilariales*, Bressan and Babbini-Benussi (1995, 1996) for *Corallinales*, Gomez Garreta *et al.* (2001) for *Ceramiales*, Ribera *et al.* (1992) for *Fucophyceae*, Gallardo *et al.* (1993) for *Chlorophyceae*]. Additionally, the studies of Barbara and Cremades (1996), Ballantine and Aponte (1997) and Hardy and Guiry (2003) were used to create an evolutionary list of taxa above genus level. Taxa in species or below species level are listed alphabetically.

Table 1: Taxa distributed on Mersin (Mediterranean) coasts of Turkey.

CYANOPHYTA	(Montagne ex Gomont)
[=CYANOBACTERIA]	Anagnostidis & Komárek
CYANOPHYCEAE	<i>L. fragilis</i> (Gomont) Anagnostidis & Komárek
CHROOCOCCALES	
CHROOCOCCACEAE	<i>Lyngbya adriae</i> Ercégovic
<i>Chroococcus dimidiatus</i> (Kützing)	<i>L. agardhii</i> (P.L. Crouan & H.M. Crouan) Gomont
Nägeli	<i>L. confervoides</i> C. Agardh
<i>C. minor</i> (Kützing) Nägeli	<i>L. majuscula</i> (Dillwyn) Harvey
	<i>L. semiplana</i> (C. Agardh) J. Agardh
MICROCYSTACEAE	<i>Oscillatoria margaritifera</i> Kützing ex Gomont
<i>Gloeocapsa compacta</i> Kützing	
<i>G. crepidinium</i> Thuret	
<i>Microcystis halophila</i> B. Martens & Pankow	
<i>M. marina</i> (Hansgrig in Foslie) Silva	
MERISMOPEDIACEAE	
GOMPHOSPHAERIOIDEAE	PHORMIDIACEAE
<i>Gomphosphaeria aponina</i> Kützing	PHORMIDIOIDEAE
	<i>Phormidium autumnale</i> C. Agardh (Gomont)
OSCILLATORIALES	<i>P. limosum</i> (Dillwyn) P.C. Silva
OSCILLATORIACEAE	<i>P. subfuscum</i> Kützing ex Gomont
<i>Leptolyngbya foveolarum</i>	<i>Porphyrosiphon martensianus</i> (Meneghini ex Gomont) Anagnostidis & Komárek
	<i>Symploca hydroides</i> (Harvey) Kützing

- var. *fasciculata* (Kützing)
Gomont
- SPIRULINOIDEAE**
Spirulina breviaritculata (Setchell
& Gardner) Geitler
S. subsalsa Oersted
- PSEUDOANABAENACEAE**
Spirocoleus tenuis (Meneghini)
Silva
- HETEROLEIBLEINIOIDEAE**
Heteroleibleinia infixa (Frémy)
Anagnostidis & Komárek
- LEPTOLYNGBYOIDEAE**
Leibleinia epiphytica (Hieronymus)
Anagnostidis & Komárek
L. gracilis Meneghini
Planktolynghya subtilis (W. West)
Anagnostidis & Komárek
- SCHIZOTHRICHACEAE**
Schizothrix lacustris (Braun)
Gomont
S. tenerrima (Gomont) F.E. Drouet
- NOSTOCALES**
RIVULARIACEAE
Calothrix aeruginea (Kützing)
Thuret
C. confervicola (Roth) C. Agardh
C. contarenii (Zanardini) Bornet
& Flahault
C. parasitica (Chauvin) Thuret
Isactis plana (Harvey) Thuret
ex Bornet & Flahault
Rivularia atra Roth ex Bornet
& Flahault
R. biasoletiana (Meneghini) Bornet
& Flahault
- RHODOPHYTA**
- RHODELLOPHYCEAE**
STYLONEMATALES
STYLONEMATACEAE
Stylonema alsidii (Zanardini)
K. Drew
S. cornu-cervi Reinsch
- COMPSOPOGONOPHYCEAE**
ERYTHROPELTIDALES
ERYTHROTRICHIACEAE
Erythrotrichia carnea (Dillwyn) J.
Agardh
Sahlingia subintegra (Rosenvinge)
Kornmann
- BANGIOPHYCEAE**
BANGIOPHYCIDAE
GONIOTRICHALES
GONIOTRICHACEAE
Chroodactylon ornatum
(C. Agardh) Basson
- BANGIALES**
BANGIACEAE
Bangia atropurpurea (Roth)
C. Agardh
Porphyra laciniata (Lightfoot)
C. Agardh
P. leucosticta Thuret in Le Jolis
f. *leucosticta*
f. *undulata* Schiffner
P. umbilicalis (Linnaeus) Kützing
- FLORIDEOPHYCEAE**
ACROCHAETIALES
ACROCHAETIACEAE
Acrochaetium crassipes (Børgesen)
Børgesen
A. mediterraneum (Levring)
Boudouresque
A. microscopicum (Nägeli)
ex Kützing) Nägeli
A. rosulatum (Rosenvinge)
Papenfuss

A. savianum (Meneghini) Nägeli
A. secundatum (Lyngbye) Nägeli
A. virgatulum (Harvey) Batters

COLACONEMATALES

COLACONEMATACEAE

Colaconema codicola (Børgesen)
Stegenk Bolton & Anderson
C. daviesii (Dillwyn) Stegenga

NEMALIALES

GALAXAURACEAE

Scinaia furcellata (Turner)

J. Agardh

Tricleocarpa cylindrica (Ellis
& Solander) Huisman
& Borowitzka

T. fragilis (Linnaeus) Huisman
& Townsend

LIAGORACEAE

Ganonema farinosum (Lamouroux)

Fan & Wang

Liagora viscida (Forsskål)

C. Agardh

NEMALIACEAE

Nemalion helminthoides (Velley)

Batters

GELIDIALES

GELIDIACEAE

Gelidium corneum (Hudson)

Lamouroux

var. *pectinatum* Ardissonne

& Strafforello

G. crinale (Hare ex Turner) Gaillon

var. *crinale*

G. minusculum (Webervan Bosse)

R.E. Norris

G. pulchellum (Turner) Kützing

G. pusillum (Stackhouse) Le Jolis

var. *pusillum*

G. spinosum (Gmelin) Silva

var. *spinosum*

var. *hystrix* (J. Agardh) Furnari

Pterocladia capillacea (Gmelin)

Santelices & Hommersand

f. *capillaceae*

P. melanoidea (Schousboe ex
Bornet)

Santelices & Hommersand

var. *melanoidea*

var. *filamentosa* (Schousboe

ex Bornet) Wynne

var. *gracilis* (Feldmann & Hamel)

Wynne

GELIDIELLACEAE

Gelidiella lubrica (Kützing)

Feldmann & Hamel

G. nigrescens (Feldmann) Feldmann

& Hamel

G. ramellosa (Kützing) Feldmann

& Hamel

Parviphycus antipai (Celan)

Santelices

P. tenuissimus (Feldmann

& Hamel) Santelices

GRACILARIALES

GRACILARIACEAE

Gracilaria bursapastoris (Gmelin)

Silva

G. gracilis (Stackhouse) Steentoft

var. *gracilis*

BONNEMAISONIALES

BONNEMAISONIACEAE

Falkenbergia rufolanosa (Harvey)

Schmitz

Trailiella intricata Batters

CORALLINALES

CORALLINACEAE

AMPHIROIDEAE

Amphiroa beauvoisii Lamouroux

A. rigida Lamouroux

CHOREONEMATOIDEAE

Choreonema thuretii (Bornet)
Schmit

CORALLINOIDEAE**CORALLINEAE**

Corallina elongata Ellis & Solander
C. panizzoi Schmetter & U. Richter

JANIEAE

Halphtilon squamatum (Linnaeus)
Johansen, Irvine & Webster
H. virgatum (Zanardini) Garbary
& Johansen
Jania longifurca Zanardini
J. rubens (Linne) Lamouroux
var. *rubens*
var. *corniculata* (Linnaeus) Yendo

MASTOPHOROIDEAE

Hydrolithon farinosum
(Lamouroux) D. Penrose
& Chamberlain
var. *farinosum*
Neogoniolithon brassica florida
(Harvey) Setchell & Mason

LITHOPHYLLOIDEAE

Lithophyllum cystoseirae (Hauck)
Heydrich
L. incrustans Philippi
L. tortuosum (Esper) Foslie
f. *tortuosum*
f. *undulosum* (Bory de
Saint-Vincent) Okudan & Aysel
Titanoderma pustulatum
(Lamouroux) Nägeli

MELOBESIOIDEAE

Melobesia membranacea (Esper)
Lamouroux sensu Chanberline
& Irvine
Mesophyllum expansum (Philippi)

Cabioch & Mendoza

M. lichenoides (Ellis) Lemoine
Phymatolithon lenormandii
(Areschoug) Adey

GIGARTINALES**ACROSYMPHYTACEAE**

Acrosymphyton purpuriferum
(J. Agardh) Sjostedt

CALOSIPHONACEAE

Calosiphonia vermicularis
(J. Agardh) Schmitz

CYSTOCLONIACEAE

Rhodophyllis divaricata
(Stackhouse) Papenfuss

FURCELLARIACEAE

Halarachnion ligulatum
(Woodward) Kützing

GIGARTINACEAE

Chondracanthus acicularis (Roth)
Fredericq

HYPNEACEAE

Hypnea musciformis (Wulfen in
Jaquin) Lamouroux
H. spinella (C. Agardh) Kützing

KALLYMENIACEAE

Kallymenia requienii (J. Agardh)
J. Agardh
Meredithia microphylla (J. Agardh)
J. Agardh

PEYSSONNELICEAE

Peyssonnelia bornetii
Boudouresque & Denizot
P. crispata Boudouresque
& Denizot
P. dubyi P.L. Crouan &
H.M. Crouan

P. harveyana P.L. Crouan &
H.M. Crouan & J. Agardh
P. polymorpha (Zanardini) Schmitz
P. rosa-marina Boudouresque
& Denizot
P. rubra (Greville) J. Agardh
P. squamaria (Gmelin) Decaisne

PHYLLOPHORACEAE
Gymnogongrus griffithsiae (Turner)
Martius

RHABDONIACEAE
Catenella caespitosa (Withering)
Irvine in Parke & Dixon

NEMASTOMACEAE
Nemastoma dichotomum J. Agardh

RHIZOPHYLLIDACEAE
Contarinia squamariae
(Meneghini) Denizot

SCHIZYMENIACEAE
Platoma cyclocalpa (Montagne)
Schmitz

WURDEMANNIACEAE
Wurdemannia miniata (Sprengel)
Feldmann & Hamel

RHODYMENIALES
RHODYMENIACEAE
Botryocladia borgeseni Feldmann
B. botryoides (Wulfen) Feldmann
B. chiajeana (Meneghini) Kylin
Chrysymenia ventricosa
(Lamouroux) J. Agardh
Rhodymenia ardissoni J. Feldmann
var. *ardissoni*
var. *spathulata* (Schiffner)
Okudan & Aysel
R. pseudopalmeta (Lamouroux)
Silva

CHAMPIACEAE
Champia parvula (C. Agardh)
Harvey
Chylocladia verticillata (Lightfoot)
Bliding

LOMENTARIACEAE
Lomentaria articulata (Hudson)
Lyngbye
var. *articulata*
L. clavellosa (Turner) Gaillon
L. verticillata Funk

HALYMENIALES
GRATELOUPIACEAE
Grateloupia dichotoma J. Agardh
G. filicina (Lamouroux) C. Agardh
G. prolongata J. Agardh

HALYMENIACEAE
Halymenia floresii (Clemente
y Rubio) C. Agardh

PLOCAMIALES
PLOCAMIACEAE
Plocamium cartilagineum Linnaeus
(Dixon)

CRYPTONEMIALES
CRYPTONEMACEAE
Cryptonemia lomation (Bertoloni)
J. Agardh

CERAMIALES
CERAMIACEAE
CALLITHAMNIOIDEAE
CALLITHAMNIEAE
Aglaothamnion caudatum
(J. Agardh) Feldmann Mazoyer
A. cordatum (Børgesen)
Feldmann Mazoyer
A. hookeri (Dilliwyn) Maggs
& Hommersand

A. tenuissimum (Bonnemaison)
Feldmann Mazoyer
var. *tenuissimum*
Callithamnion corymbosum (Smith)
Lyngbye
C. granulatum (Ducluzeau)
C. Agardh

GYMNOTHAMNIEAE

Gymnothamnion elegans
(Schousboe ex C. Agardh)
J. Agardh

CERAMOIDEAE

ANTITHAMNIEAE

Antithamnion cruciatum
(C. Agardh) Nägeli
var. *cruciatum*

CERAMIEAE

Ceramium ciliatum (Ellis)
Ducluzeau
var. *ciliatum*
var. *robustrum* (J. Agardh)
Mazoyer
C. cimbricum Petersen
f. *cimbricum*
C. circinatum (Kützing) J. Agardh
C. deslongchampsii Chauvin
ex Duby
C. flaccidum (Kützing) Ardissonne
C. rubrum auctorum
var. *rubrum*
C. siliquosum (Kützing) Maggs
& Hommersend
var. *siliquosum*
var. *elegans* (Roth) Furnari
var. *tenuissimum* (Lyngbye)
V Aysel, B Dural Tarakçı,
H Erduğan, F Aysel, E Türker,
Y Tarakçı
C. tenerrimum (G. Martens) Okamura
var. *tenerrimum*
var. *brevizonatum* (Peterson)

Feldmann Mazoyer
Centroceras clavulatum
(C. Agardh) Montagne
Corallophila cinnabarina
(Grateloup ex Bory) R.E. Norris

CROUANIEAE

Crouania attenuata (C. Agardh)
J. Agardh

GRIFFITHSIEAE

Anotrichium barbatum (C. Agardh)
Nägeli
A. tenue (C. Agardh) Nägeli
Griffithsia devoniensis Harvey
G. phyllamphora J. Agardh
G. schousboei Montagne
var. *schousboei*
var. *minor* G. Feldmann
ex Feldmann Mazoyer

PTEROTHAMNIEAE

Pterothamnion crispum
(Ducluzeau) Nägeli
P. plumula (Ellis) Nägeli

SPYRIDEAE

Spyridia filamentosa (Wulfen)
Harvey in W.J. Hooker
S. hypnoides (Bory) Peperfuss

WRANGELIEAE

Wrangelia penicillata (C. Agardh)
C. Agardh

COMPSOTHAMNIOIDEAE

COMPSOTHAMNIEAE

Compsothamnion thuyoides
(J.E. Smith) Schmitz

MONOSPOREAE

Monosporus pedicellatus
(J.E. Smith) Solier

SPERMOTHAMNIEAE*Spermothamnion flabellatum*

Bornet

S. repens (Dillwyn) Rosenvingevar. *repens*var. *flagelliferum* (De Notaris)

Feldmann Mazoyer

SPONGOCLONIEAE*Pleonosporium borrieri* (J.E. Smith)

Nägeli

DASYACEAE*Dasya baillouviana* (Gmelin)

Montagne

var. *baillouviana**D. corymbifera* J. Agardh*D. hutchinsiae* Harvey in

W.J. Hooker

D. punicea (Zanardini) Meneghini

ex Zanardini

D. rigidula (Kützing) Ardissonne*Eupogodon planus* (C. Agardh)

Kützing

Heterosiphonia crispella

(C. Agardh) Wynne

DELESSERIACEAE**DELESSERIOIDEAE****APOGLOSSEAE***Apoglossum ruscifolium* (Turner)

J. Agardh

HYPOGLOSSEAE*Hypoglossum hypoglossoides*

(Stackhouse) Collins & Harvey

NITOPHYLLOIDEAE**NITOPHYLLEAE***Nitophyllum punctatum*

(Stackhouse) Greville

var. *punctatum**Radicilingua thysanorhizans*

(Holmes) Papenfuss

PHYCODYOIDEAE**CRYPTOPLEUREAE***Acrosorium ciliolatum* (Harvey)

Kylin

MYRIOGRAMMEAE*Myriogramme minuta* Kylin**Subfamilia and Tribus not known:***Taenioma nanum* (Kützing)

Papenfuss

RHODOMELACEAE**AMANSIEAE***Halopithys incurva* (Hudson)

Batters

Osmundaria volubilis (Linnaeus)

R.E. Norris

Rytiphlaea tinctoria (Clemente)

C. Agardh

CHONDRIEAE*Acanthophora nayadiformis*

(Delilei) Papenfuss

Chondria capillaris (Hudson)

Wynne

var. *capillaris**C. dasyphylla* (Woodward)

C. Agardh

LAURENCIEAE*Chondrophycus paniculatus*

(C. Agardh) Furnari

C. papillosus (C. Agardh) Garbary

& J. Harper

Erythrocyctis montagnei (Derbès

& Solier) Silva

Laurencia obtusa (Hudson)

Lamouroux

var. *obtusa*var. *gracilis* (Kützing) Hauckvar. *laxa* (Kützing) Ardissonnevar. *racemosa* Kützing

L. pyramidalis Bory
de SaintVincent ex Kützing
Osmundea pelagosae (Schiffner) Nam
O. pinnatifida (Hudson) Stackhouse

POLYSIPHONIEAE

Alsidium corallinum C. Agardh
A. helminthochorton
(Schwendimann) Kützing
A. lanciferum Kützing
Boergesenella fruticulosa (Wulfen)
Kylin
Digenea simplex (Wulfen)
C. Agardh
Herposiphonia secunda
(C. Agardh) Ambronn
f. *secunda*
f. *tenella* (C. Agardh) Wynne
Lophocladia lallemandii
(Montagne) Schmitz
Lophosiphonia cristata Falkenberg
L. obscura (C. Agardh) Falkenberg
L. scopulorum (Harvey) Womersley
L. subadunca (Kützing) Falkenberg
Polysiphonia atra Zanardini
P. biasoletiana J. Agardh
P. deusta (Roth) Sprengel
P. elongata (Hudson) Sprengel
P. flocculosa (C. Agardh) Endlicher
P. furcellata (C. Agardh) Harvey
P. kellneri Zanardini
P. opaca (C. Agardh) Moris & De
Notaris
P. sertularioides (Grateloup)
J. Agardh
P. tenerrima Kützing
P. tripinnata J. Agardh
P. variegata (C. Agardh) Zanardini
P. violacea (Roth) Sprengel

POLYZONIEAE

Dipterosiphonia rigens (Shousboei)
Falkenberg

PTEROSIPHONIEAE

Pterosiphonia pennata (C. Agardh)
Sauvageau

OCHROPHYTA

[=HETEROKONTOPHYTA]

FUCOPHYCEAE

ECTOCARPALES

ECTOCARPACEAE

Acinetospora crinita (Carmichael ex
Harvey) Kornmann
Ectocarpus siliculosus (Dillwyn)
Lyngbye
var. *siliculosus*
var. *crouaniorum* (Thuret)
Gallardo
var. *penicillatus* C. Agardh
E. virescens Thuret ex Sauvageau
Feldmannia caespitula (J. Agardh)
KnoepfflerPéguy
var. *caespitula*
var. *lebelii* (Areschoug ex
P.L. Crouan) Knoepffler Péguy
F. irregularis (Kützing) Hamel
F. globifera (Kützing) Hamel
F. padinae (Buffham) Hamel
Hinckia mitchelliae (Harvey) Silva
H. sandriana (Zanardini) Silva
Streblonema sphaericum (Derbès
& Solier) Thuret

CHORDARIALES

MYRIONEMATACEAE

Myrionema strangulans Greville

ELACHISTACEAE

Halothrix lumbricalis (Kützing)
Reinke

LEATHESIIACEAE

Leathesia mucosa Feldmann

CORYNOPHLAEACEAE

Corynophlaea umbellata

(C. Agardh) Kützing
Myriactula arabica (Kützing)
Feldmann
M. rivulariae (Shur) Feldmann

SPERMATOCHNACEAE
Stilophora tenella (Esper) Silva

CHORDARIACEAE
Cladosiphon mediterraneus
Kützing
C. zosterae (J. Agardh) Kylin
Liebmannia leveillei J. Agardh
Sphaerotrichia divaricata
(C. Agardh) Kylin

RALFSIALES
RALFSIACEAE
Hapalospongidion macrocarpum
(Feldmann) León Álvarez
& González
Ralfsia verrucosa (Areschoug)
Areschoug

CUTLERIALES
CUTLERIACEAE
Cutleria chilosa (Falkenberg) Silva
C. multifida (Turner) Greville
Zanardinia typus (Nardo) Furnari

SPHACELARIALES
SPHACELARIACEAE
Sphacelaria cirrosa (Roth)
C. Agardh
f. *cirrosa*
f. *mediterranea* Sauvageau
S. fusca (Hudson) S.F. Gray
S. plumula Zanardini
S. rigidula Kützing
S. tribuloides Meneghini

STYPOCAULACEAE
Halopteris filicina (Grateloup)
Kützing

H. scoparia Linnaeus Sauvageau
var. *patentissima* Sauvageau

CLADOSTEPHACEAE
Cladostephus spongiosus (Hudson)
C. Agardh
f. *spongiosus*
f. *verticillatus* (Lightfoot)
Prod'homme van Reine

DICTYOTALES
DICTYOTACEAE
Dictyopteris polypodioides
(De Candolle) Lamouroux
Dictyota dichotoma (Hudson)
Lamouroux
var. *intricata* (C. Agardh)
Greville
D. fasciola (Roth) Lamouroux
var. *fasciola*
var. *repens* (J. Agardh) Ardissonne
D. linearis (C. Agardh) Greville
f. *linearis*
f. *divaricatus* (Lamouroux)
nov. nom.
D. mediterranea (Schiffner) Furnari
var. *mediterranea*
var. *crassa* (Schiffner) V Aysel,
H Erduğan, EŞ Okudan, H Erk
D. menstrualis (Hoyt) Schmetter,
Hornig & WeberPeukert
var. *menstrualis*
D. spiralis Montagne
Lobophora variegata (Lamouroux)
Womersley ex Oliveira
Padina pavonica (Linnaeus) Thivy
Stypopodium schimperi (Buchinger
ex Kützing) Verlaque
& Boudouresque
Taonia atomaria (Woodward)
J. Agardh
f. *atomaria*
f. *ciliata* (C. Agardh)
Nizamuddin

Zonaria tournefortii (Lamouroux)
Montagne

MYRIOTRICHIACEAE

Myriotrichia clavaeformis Harvey

GIRAUDIACEAE

Giraudia sphacelarioides Derbès
& Solier

ASPEROCOCCACEAE

Asperococcus bullosus Lamouroux
f. *bullosus*

A. fistulosus (Hudson) W.J. Hooker

PUCTARIALES

PUNCTARIACEAE

Punctaria latifolia Greville

SCYTOSIPHONALES

COLPOMENIACEAE

Colpomenia sinuosa (Mertens
ex Roth) Derbès & Solier

Hydroclathrus clathratus
(C. Agardh) Howe

SCYTOSIPHONACEAE

Petalonia fascia (Müller) Kuntze

Scytosiphon simplicissimus
(Clemente) Cremades
var. *simplicissimus*

FUCALES

CYTOSEIRACEAE

Cystoseira amentacea Bory
var. *amentacea*

var. *spicata* (Ercégovic) Giaccone

C. barbata (Stackhouse) C. Agardh
var. *barbata*

C. compressa (Esper) Gerloff
& Nizamuddin
f. *compressa*

C. corniculata (Turner) Zanardini
var. *corniculata*

C. crinita (Desfontaines) Bory
f. *crinita*

C. crinitophylla Ercégovic

C. elegans Sauvageau

C. foeniculacea (Linnaeus) Greville
f. *tenuiramosa* (Ercégovic)

A. Gómez Garret M.C. Barceló,
Ribera & J. Rull Lluch

C. humulis Schousboe ex Kützing
var. *humulis*

C. mediterranea Sauvageau
var. *mediterranea*

var. *valiantei* Sauvageau

C. spinosa Sauvageau

C. squarrosa De Notaris

SARGASSACEAE

Sargassum acinarum (Linnaeus)
Setchell

S. hornschurchii C. Agardh

S. vulgare C. Agardh
var. *vulgare*

CHLOROPHYTA

CHLOROPHYCEAE

PHAEOPHILALES

PHAEOPHILACEAE

Phaeophila dendroides (P. L.

Crouan & H. M. Crouan) Batters

TETRASPORALES

PALMELLOPSIDACEAE

Palmophyllum crassum (Naccari)
Rabenhorst

CHLOROCOCCALES

ENDOSPHAERACEAE

Gomontia polyrhiza (Leigerheim)
Bornet & Flahault

CHAETOPHORALES

CHAETOPHORACEAE

Bolbocoleon piliferum Pringsheim

Entocladia viridis Reinke

Pringsheimiella scutata (Reinke)

Höhnel *ex* Marchewianka

SPHAEROPLEALES

SPHAEROPLEACEAE

Sphaeroplea annulina (Roth)

C. Agardh

ULVOPHYCEAE

ULOTRICHALES

BORODINELLACEAE

Planophila microcystis (Dangeard)

Kornmann & Sahling

ULOTHRICHACEAE

Ulothrix flacca (Dillwyn) Thuret *in*

Le Jolis

U. zonata (Weber & Mohr) Kützing

ULVALES

ULVACEAE

Enteromorpha clathrata (Roth)

Greville

E. compressa (Linnaeus) Nees

var. *compressa*

E. flexuosa (Wulfen) J. Agardh

subsp. *flexuosa*

E. intestinalis (Linnaeus) Nees

var. *intestinalis*

E. linza (Linnaeus) J. Agardh

var. *linza*

var. *crispata* (Bertoloni) J. Agardh

var. *minor* Schiffner

E. multiramosa Bliding

E. prolifera (Müller) J. Agardh

subsp. *prolifera*

Ulva fasciata Delile

U. lactuca Linnaeus

f. *lactuca*

U. rigida C. Agardh

f. *rigida*

U. taeniata (Setchell) Setchell

& Gardner

ULVELLACEAE

Acrochaete repens Pringsheim

Epicladia flustrae Reinke

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

Crouan

TRENTEPOHLIOPHYCEAE

TRENTEPOHLIALES

TRENTEPHOLIACEAE

Chlorotylum cataractarum Kützing

CLADOPHOROPHYCEAE

CLADOPHORALES

ANADYOMENACEAE

Anadyomene stellata (Wulfen)

C. Agardh

CLADOPHORACEAE

Chaetomorpha aerea (Dillwyn)

Kützing

C. linum (Müller) Kützing

Cladophora albida (Nees) Kützing

C. catenata (C. Agardh) Hauck

C. coelothrix Kützing

C. dalmatica Kützing

C. glomerata (Linnaeus) Kützing

var. *glomerata*

var. *marina* Lyngbye

C. hutchinsiae (Dillwyn) Kützing

C. laetevirens (Dillwyn) Kützing

C. lehmanniana (Lindenberg)

Kützing

C. mediterranea Hauck

C. oblitterata Söderström

C. pellucida (Hudson) Kützing

f. *pellucida*

C. prolifera (Roth) Kützing

C. ruchingeri (C. Agardh) Kützing

C. sericea (Hudson) Kützing

C. trichotoma (C. Agardh) Kützing

Cladophoropsis modenensis

(Kützing) Børgesen

Rhizoclonium riparium (Roth)

Harvey

R. tortuosum (Dillwyn) Kützing

SIPHONOCLADALES

SIPHONOCLADACEAE

Siphonocladus pusillus (C. Agardh
ex Kützing) Hauck

VALONIACEAE

Valonia macrophysa Kützing
V. utricularis (Roth) C. Agardh

BRYOPSIDOPHYCEAE

BRYOPSIDALES

BRYOPSIDACEAE

Bryopsis corymbosa J. Agardh
B. duplex De Notaris
B. flagellata Kützing
B. hypnoides Lamouroux
var. *hypnoides*
B. muscosa Lamouroux
B. pennata Lamouroux
B. plumosa (Hudson) C. Agardh
var. *plumosa*

DERBESIALES

DERBESIACEAE

Derbesia tenuissima (Morris & De
Notaris) P. L. Crouan & H. M.
Crouan
Pedobesia simplex (Meneghini ex
Kützing) Wynne & Leliaert

CODIALES

CODIACEAE

Codium adhaerens C. Agardh
C. bursa (Linnaeus) C. Agardh
C. effusum (Rafinesque) Delle
Chiaje
C. tomentosum Stackhouse
C. vermilara (Oliv) Delle Chiaje

CAULERPALES

CAULERPACEAE

Caulerpa ollivieri Dostal

C. prolifera (Forsskål) Lamouroux

C. racemosa (Forsskål) J. Agardh
var. *lamourouxii* (Turner)
Webervan Bosse
f. *requienii* (Montagne) Weber
van Bosse

UDOTEACEAE

Flabellia petiolata (Turra)
Nizamuddin
Pseudochlorodesmis furcellata
(Zanardini) Børgesen

HALIMEDALES

HALIMEDACEAE

Halimeda tuna (Ellis & Solander)
Lamouroux

DASYCLADOPHYCEAE

DASYCLADALES

DASYCLADACEAE

Dasycladus vermicularis (Scopoli)
Krasser

ACETABULARIACEAE

Acetabularia acetabulum
(Linnaeus) Silva

TRACHEOPHYTA

[=MAGNOLIOPHYTA]

ANGIOSPERMAE

LILIOPSIDA

CYMODOCEALES

CYMODOCEACEAE

Cymodocea nodosa (Ucria)
Ascherson

POSIDONIALES

POSIDONIACEAE

Posidonia oceanica (Linnaeus)
Delile

ZOSTERALES

ZOSTERACEAE

Zostera marina Linnaeus

Z. noltii Homermann

HYDROCHARITALES

HYDROCHARITACEAE

Halophila stipulacea (Forsskål)

Ascherson

Discussion

401 taxa (396 algae and 5 *seagrasses*) have been found in the present study. As seen in Table 2, the comparison of the number of algal species of Mersin with those of the other Mediterranean coastal cities of Turkey is given. Phycologically, one of the richest provinces of southern Turkey is Mersin when compare with the other cities of Mediterranean

Table 2: The number of algae species of Mersin and the other the Mediterranean coastal cities (MR: Mersin, MR*: (Aysel *et al.*, 1996, 1998, Aysel 1997a-b, Cirik 1986, 1991) MU: Muğla, AN: Antalya, AD: Adana, HT: Hatay).

Division	Studied Cities of Turkish Mediterranean Shores					
	MR	MR*	MU	AN	AD	HT
<i>Cyanophyta</i> (Cy)	36	14	40	36	27	30
<i>Rhodophyta</i> (R)	204	131	222	198	204	201
<i>Ochrophyta</i> (O)	82	62	99	74	78	73
<i>Chlorophyta</i> (C)	74	52	73	67	72	73
<i>Magnoliophyta</i>	5	5	5	5	5	5
Total	401	264	439	380	386	382

Species of *Sargassum*, *Cystoseira*, *Zanardinia* and *Styopodium schimperi* are the most encountered algae along Mersin shore. *Corallina mediterranea*, *Callithamnion corymbosum*, *Herposiphonia secunda* f. *tenella*, *Laurencia obtusa* var. *obtusa*, *Polysiphonia sertularioides* (*Rhodophyceae*), *Ectocarpus siliculosus* var. *siliculosus* (*Fucophyceae*), *Enteromorpha linza* var. *linza*, *E. prolifera* subsp. *prolifera*, *Ulva rigida* f. *rigida* and some of *Cladophora* species (*Chlorophyta*) are common algae of the area.

As seen in Table 3, number of *Cyanophyta* species is low in Mersin as same as other Mediterranean cities (Adana and Hatay). This division was not sufficiently investigated in these cities before from this reseach. Especially, Adana and Hatay shores in the İskenderun Bay have been polluted by domestic and industrial pollution.

While common taxa of the seagrasses *Posidonia*, *Zostera* and *Cymodocea* are also found in Mersin shores, some algae, such as taxa of *Herposiphonia*, *Polysiphonia*, *Ceramium*, *Ectocarpus*, *Enteromorpha* and *Cladophora* are common as epiphytically on macro algae (*Gracilaria*, *Hypnea*, *Cystoseira*, *Cladostephus*, *Halopteris*, *Dictyopteris*, *Dictyota*, *Cladophora*, *Ulva*, *Codium* etc.) and marine phenerogams.

Table 3: Dominancy in division level among southern provinces of Turkey

Division	Dominancy as cities in division level from the mediterranean shores of Turkey					
	MR	MR*	MU	AN	AD	HT
R/O	2.487	2.112	2.242	2,675	2.615	2.753
R/C	2.756	2.519	3.041	2,955	2.833	2.753
R/CY	5.666	9.357	5.550	5,500	7.555	6.700
O/C	1.108	1.192	1.356	1,104	1.083	1
O/CY	2.277	4.428	2.475	2,055	2.888	2.433
C/CY	2.055	3.714	1.825	1,861	2.666	2.433

Dominancy of taxa depending upon on provinces is summarized in Table 3. In this table, R/O values are relatively close among all provinces and changes between 2,242 and 2,753. (same as Antalya).

Özet

Bu arařtırmada, Mersin (Türkiye'nin akdeniz kıyıları) kıyılarının üst infralittoralinde yayılıř gösteren deniz algleri ve deniz çayırları çalıřılmıřtır. Toplam 396 alg ve 5 deniz çayırı tayin edilmiřtir. Bunların 36 tanesi Mavi-yeřil bakteriler (*Cyanophyceae*), 204 tanesi kırmızı algler [*Rhodellophyceae* (2), *Compsopogonophyceae* (2), *Bangiophyceae* (6), *Florideophyceae*(194)], 82 tanesi kahverengi algler (*Fucophyceae*), 74 tanesi yeřil alglere [*Chlorophyceae* (7), *Ulvophyceae* (19), *Trentepohliophyceae* (1), *Cladophorophyceae* (25), *Bryopsidophyceae* (20), *Dasycladophyceae* (2)] ve 5 tanesi deniz çayıridir (*Liliopsida*).

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