

RESEARCH ARTICLE

Benthic marine algae in Northern Cyprus (Eastern Mediterranean Sea)

Ergün Taşkin^{*}, Mehmet Öztürk, Oğuz Kurt, Sevilay Ulcay

Department of Biology, Faculty of Arts and Sciences, Celal Bayar University, 45140, Muradiye, Manisa, TURKEY

^{*}**Corresponding author:** ergun.taskin@bayar.edu.tr

Abstract

This paper reports 242 taxa at species and infraspecies level of the benthic marine algae (75 Phaeophyceae, 129 Rhodophyta, and 38 Chlorophyta) from Northern Cyprus. Among them, 107 taxa are recorded for the first time from the coast of Northern Cyprus. Sampling was made at seven different localities (Yeşilırmak, Koruçam, Girne, Dip Karpaz, Kumyalı, Salamis, and Gazi Mağusa) in North Cyprus in 2005-2008.

Key words: Algae, Chlorophyta, Cyprus, Phaeophyceae, Rhodophyta.

Introduction

The benthic marine algae of the eastern Mediterranean Sea have been investigated by several researchers (Haritonidis and Tsekos 1976; Mayhoub 1976; Tsekos and Haritonidis 1977, Öztürk 1988, 1993, 1996a,b; Aysel and Gezerler 1996; Aysel 1997a,b; Öztürk and Taşkin 1999; Taşkin *et al.* 2001, Einav 2007). Taşkin *et al.* (2008a) reported 382 taxa (species and infraspecies level) to occur in the Turkish Mediterranean coast. Three hundred taxa (species and infraspecies level) were reported from Israel by Einav and Israel (2008). Recently, three alien marine algae, *Codium parvulum* (Bory ex Audouin) P. C. Silva, *Codium arabicum* Kützing, and *Caulerpa taxifolia* var. *distichophylla* (Sonder) Verlaque, Huisman *et al.* Procaccini, have been reported for the first time in the eastern Mediterranean Sea (Israel *et al.* 2010; Hoffman *et al.* 2011; Jongma *et al.* 2013).

Cyprus is the third largest island in the Mediterranean Sea (its area 9251 km²) found 390 km north of Egypt, 75 km south of Turkey and 380 km from the Rhodes. Several studies including or dealing only with the marine algae of Cyprus have been made by Argyrou *et al.* (1999), Benli *et al.* (1999), Cirik *et al.*

(2000), Verlaque *et al.* (2000), Kurt *et al.* (2008), Taşkin *et al.* (2008b), and ÖzTÜRK *et al.* (2009). Seven alien and invasive marine plants taxa [*Womersleyella setacea* (Hollenberg) R. E. Norris, *Polysiphonia fucoides* (Hudson) Greville, *Polysiphonia atlantica* Kapraun *et* Norris, *Stylopodium schimperi* (Buchinger *ex* Kützing) Verlaque *et* Boudouresque, *Caulerpa racemosa* (Forsskål) J. Agardh var. *racemosa*, *Caulerpa racemosa* var. *cylindracea* (Sonder) Verlaque, Huisman *et* Boudouresque, and *Halophila stipulacea* (Forsskål) Ascherson] were reported from the Northern Cyprus by Taşkin *et al.* (2008). Recently, the benthic marine blue green algae have been studied from Northern Cyprus by Ulcay *et al.* (2013), and 47 taxa at species and infraspecies level have been reported, eight of which have been recorded for the first time in the Mediterranean Sea.

The aim of the present study is to increase the knowledge of the benthic marine algal flora (Phaeophyceae, Rhodophyta, and Chlorophyta) of Northern Cyprus.

Materials and Methods

Sampling was made at seven different localities [Yeşilırmak (35°10'28" N - 32°44'29" E), Koruçam (35°24'14" N - 32°55'16" E), Girne (35°20'44" N - 33°19'42" E), Dip Karpaz (35°36'22" N - 34°26'53" E), Kumyalı (35°24'59" N - 34°07'70" E), Salamis (35°15'28" N - 33°54'29" E), Gazi Mağusa (35°07'03" N - 33°57'29" E)] in North Cyprus in 2005-2008 (Figure 1). The materials were collected by snorkelling and SCUBA-diving, and specimens were preserved in 4% formaldehyde in sea water. Voucher specimens are deposited in the Department of Biology of the Celal Bayar University (Manisa, Turkey) and Herbarium Center (NEUN), Near East University (Lefkoşa). The identifications of the marine algae were made according to previous studies (Hamel 1931-1939; Feldmann 1937; Abbot and Hollenberg 1976; Aysel 1980; Coppejans 1983; Fletcher 1987; ÖzTÜRK 1988; Burrows 1991; Womersley 1998; Furnari *et al.* 2001; Bressan and Babbini 2003; Brodie and Irvine 2003). Nomenclature was checked against Guiry and Guiry (2013).

Results and Discussion

The present study reports 242 taxa at species and infraspecies level of the benthic marine algae (75 Phaeophyceae, 129 Rhodophyta, and 38 Chlorophyta) (Table 1), and most taxa were found in Girne (Figure 2). The number of taxa found at each sampling site is as follows: 25 taxa Girne, 10 taxa Gazi Mağusa, 5 taxa Dip Karpaz and 3 taxa Koruçam.



Figure 1. Map of Cyprus showing sampling sites

Table 1. List of benthic marine algae from Northern Cyprus

Taxa	Stations
PHAEOPHYCEAE (BROWN ALGAE)	
<i>Achinetospora crinita</i> (Carmichael) Sauvageau	Gazi Mağusa
<i>Cladodesiphon irregularis</i> (Sauvageau) Kylin	Salamis
<i>Cladodesiphon mediterraneus</i> Kützing	Kumyali
<i>Cladostethus spongiosum</i> (Hudson) C. Agardh	Dip Karpaz
<i>Colpomenia sinuosa</i> (Mertens ex Roth) Derbès et Solier	Girne
<i>Corynophylaea flaccida</i> (C. Agardh) Kützing	Koruçam
<i>Corynophylaea umbellata</i> (C. Agardh) Kützing	Yeşilirmak
<i>Cutleria adspersa</i> (Roth) De Notaris	
<i>Cutleria multifida</i> (Turner) Greville	
<i>Cystoseira amentacea</i> (C. Agardh) Bory var. <i>stricta</i> Montagne	
<i>Cystoseira barbata</i> (Stackhouse) C. Agardh	
<i>Cystoseira compressa</i> (Esper) Gerloff et Nizamuddin f. <i>compressa</i>	
<i>Cystoseira compressa</i> f. <i>plana</i> (Ercovic) Cormaci et al.	
<i>Cystoseira corniculata</i> (Turner) Zanardini	
<i>Cystoseira crinita</i> Duby	
<i>Cystoseira foeniculacea</i> (L.) Greville f. <i>foeniculacea</i>	
<i>Cystoseira foeniculacea</i> f. <i>tenuitramosa</i> (Ercovic) Gómez Garreta, Barceló, Ribera et Lluch	
<i>Cystoseira humilis</i> Kützing var. <i>humilis</i>	
<i>Cystoseira humilis</i> var. <i>myriophylloides</i> (Sauvageau) J.H. Price et D.M. John	
<i>Cystoseira mediterranea</i> Sauvageau	
<i>Cystoseira spinosa</i> Sauvageau	
<i>Cystoseira zosteroides</i> C. Agardh	
<i>Dicyopenis lucida</i> Ribera Siguan, Gómez Garreta, Pérez Ruzaña, Barceló Martí et Lluch	

Table 1. Continued

Taxa	Stations	Gazi Mağusa	Salamis	Kumyali	Dip Karpaz	Girne	Koruçam	Yeşilirmak	
PHAEOPHYCEAE (BROWN ALGAE)									
<i>Dicyotopeltis polypodioides</i> (De Candolle) J. V. Lamouroux		+	+	+		+	+	+	+
<i>Dicyota dichotoma</i> (Hudson) J. V. Lamouroux var. <i>dichotoma</i>		+	+	+			+	+	+
<i>Dicyota dichotoma</i> var. <i>intricata</i> (C. Agardh) Greville		+				+		+	
<i>Dicyota fasciata</i> (Roth) J. V. Lamouroux									
<i>Dicyota linearis</i> (C. Agardh) Greville									
<i>Dicyota spiralis</i> Montagne									
<i>Ectocarpus crouaniorum</i> Thuret									
<i>Ectocarpus fasciculatus</i> Harvey									
<i>Ectocarpus siliculosus</i> (Dillwyn) Lyngbye var. <i>siliculosus</i>									
<i>Ectocarpus siliculosus</i> var. <i>penicillatus</i> C. Agardh									
<i>Eudesme virescens</i> (Carmichael ex Berkeley) J. Agardh									
<i>Feldmannia irregularis</i> (Kützing) Hamel									
<i>Feldmannia lebelii</i> (P. L. et H. M. Crouan) Hamel									
<i>Feldmannia padinae</i> (Buffham) G. Hamel									
<i>Feldmannia paradoxata</i> (Montagne) Hamel var. <i>paradoxa</i>									
<i>Feldmannia paradoxata</i> var. <i>caespitula</i> (J. Agardh) Cormaci et Furnari									
<i>Halopteris filicina</i> (Grateloup) Kützing									
<i>Halopteris scoparia</i> (L.) Sauvageau									
<i>Hapalospongia macrocarpum</i> (Feldmann) León Álvarez et González									
<i>Hecatomea terminale</i> (Kützing) Kylin									
<i>Hnckssia michelliae</i> (Harvey) P. C. Silva									
<i>Hydroclathrus clathratus</i> (Bory ex C. Agardh) Howe									
<i>Kuetzingiella battersii</i> (Bornet) Kommann								+	

Table 1. Continued

		Stations
	Taxa	
PHAEOPHYCEAE (BROWN ALGAE)		
	<i>Microspongium stizophorae</i> (P. L. et H.M. Crouan) Cormaci et G. Furnari	
	<i>Mikrosyphar polysiphoniae</i> Kuckuck	
	<i>Myriactula arabica</i> (Kützing) Feldmann	
	<i>Myriactula rivulariae</i> (Suhrl) Feldmann	
	<i>Myriomena orbicularis</i> J. Agardh	
	<i>Myriomena strangulans</i> Greville	
	<i>Myriotrichia claviformis</i> Harvey	
	<i>Nemacystus flexuosus</i> (C. Agardh) Kylin var. <i>giraudyi</i> (J. Agardh) De Jong	
	<i>Nereia filiformis</i> (J. Agardh) Zanardini	
	<i>Padina ditrastomatia</i> Ni-Ni-Win et Kawai	
	<i>Padina pavonica</i> (L.) Thivy	
	<i>Petalonia fascia</i> (O. F. Müller) Kuntze	
	<i>Protectocarpus speciosus</i> (Borgesen) Kormmann	
	<i>Pseudolithoderma adriaticum</i> (Hauck) Verlaque	
	<i>Punctaria latifolia</i> Greville	
	<i>Ralfsia verrucosa</i> (Areschoug) Areschoug	
	<i>Sargassum aciculatum</i> (L.) Setchell	
	<i>Sargassum hornschuchii</i> C. Agardh	
	<i>Sargassum vulgare</i> C. Agardh	
	<i>Scytiophyton lomentaria</i> (Lyngbye) Link	
	<i>Spermatophyllum paradoxus</i> (Roth) Kützing	
	<i>Sphaerocelaria cirroa</i> (Roth) C. Agardh	
	<i>Sphaerocelaria fusca</i> (Hudson) S. F. Gray	

Table 1. Continued

		Stations	
		Taxa	
PHAEOPHYCEAE (BROWN ALGAE)			
		<i>Sphaerelaria rigidula</i> Kützing	
		<i>Sphaerelaria tribuloides</i> Meneghini	
		<i>Stilophora tenella</i> (Esper) P. C. Silva	
		<i>Stylopyodium schimperi</i> (Buchinger ex Kützing) Verlaque et Boudouresque	
		<i>Taonia atomaria</i> (Woodward) J. Agardh	
		<i>Taonia pseudociliata</i> (J. V. Lamouroux) Nizamuddin et Godech	
		<i>Zanardinia typus</i> (Nardo) P. C. Silva	
RHODOPHYTA (RED ALGAE)			
		<i>Acrochaetium microscopicum</i> (Nägeli ex Kützing) Nägeli	
		<i>Acrochaetium savianum</i> (Meneghini) Nägeli	
		<i>Acrochaetium secundatum</i> (Lyngbye) Nägeli	
		<i>Acrochaetium virginatum</i> (Harvey) Batters	
		<i>Aglaothamnion bipinnatum</i> (P. L. et H. M. Crouan) J. Feldmann et G. Feldmann	
		<i>Aglaothamnion pseudophysoides</i> (P. L. et H. M. Crouan) Halos	
		<i>Amphiroa beauvoisii</i> J. V. Lamouroux	
		<i>Amphiroa cryptarthrodia</i> Zanardini	
		<i>Amphiroa rigida</i> J. V. Lamouroux	
		<i>Anorrichium tenuum</i> (C. Agardh) Nägeli	
		<i>Antithamnion cruciatum</i> (C. Agardh) Nägeli	
		<i>Asparagopsis armata</i> Harvey	
		<i>Bangia atropurpurea</i> (Mertens ex Roth) C. Agardh	
		<i>Boergeseniella fruticulosa</i> (Wulfen) Kylin	
		<i>Botryocladia botryoides</i> (Wulfen) Feldmann	+

Table 1. Continued

Stations	Taxa
Gazi Mağusa	+
Salamis	+
Kumyali	+
Dip Karpaz	+
Girne	+
Koruçam	+
Yeşilirmak	+
RHODOPHYTA (RED ALGAE)	
	<i>Bryocladia madagascariensis</i> G. Feldmann
	<i>Bryocladia skottsbergii</i> (Borgesen) Levring
	<i>Callithamnion corymbosum</i> (Smith) Lyngbye
	<i>Caulacanthus usulatus</i> (Mertens ex Turner) Kützing
	<i>Centroceras clavatum</i> (C. Agardh) Montagne
	<i>Ceramium ciliatum</i> (J. Ellis) Ducluzeau var. <i>ciliatum</i>
	<i>Ceramium ciliatum</i> var. <i>robustum</i> (J. Agardh) Mazoyer
	<i>Ceramium circinatum</i> (Kützing) J. Agardh
	<i>Ceramium codii</i> (H. Richards) Mazoyer
	<i>Ceramium cupulatum</i> Womersley
	<i>Ceramium diaphanum</i> (Lightfoot) Roth
	<i>Ceramium gaditanum</i> (Clemente) Cremades var. <i>mediiterraneum</i> (Debray) Cremades
	<i>Ceramium giacconei</i> Cormaci et G. Furnari
	<i>Ceramium secundatum</i> Lyngbye
	<i>Ceramium siliculosum</i> (Kützing) Maggs et Hommersand var. <i>lophophorum</i> (Feldmann-Mazoyer) Serio
	<i>Ceramium tenerimum</i> (G. Martens) Okamura var. <i>brevizonatum</i> (H.E. Petersen) Feldmann-Mazoyer
	<i>Champia parvula</i> (C. Agardh) Harvey
	<i>Chondracanthus aciculans</i> (Roth) Fredericq
	<i>Chondria capillaris</i> (Hudson) M. J. Wynne
	<i>Chondria dasypylla</i> (Woodward) C. Agardh
	<i>Chondria mairei</i> G. Feldmann
	<i>Choreomella thureti</i> (Bornet) Schimmitz
	<i>Chroodactylon ornatum</i> (C. Agardh) Basson

Table 1. Continued

Table 1. Continued

Stations	Taxa	RHODOPHYTA (RED ALGAE)																			
		<i>Gelidium corneum</i> (Hudson) J. V. Lamouroux var. <i>pectinatum</i> Ardissone et Strafforello	<i>Gelidium spathulatum</i> (Kützing) Bornet	<i>Griffithsia schousboei</i> Montagne	<i>Gymnogongrus griffithsiae</i> (Turner) Martius	<i>Haliptilon attenuatum</i> (Kützing) Garbarry et Johansen	<i>Halopithys incurva</i> (Hudson) Battens	<i>Halymenia latifolia</i> P. L. Crouan et H. M. Crouan ex Kützing	<i>Haraldiophyllum bonnemaisonii</i> (Kylin) A. D. Zinova	<i>Herposiphonia secunda</i> (C. Agardh) Ambronn f. <i>secunda</i>	<i>Herposiphonia secunda</i> f. <i>tenella</i> (C. Agardh) M. J. Wynne	<i>Heterosiphonia crispella</i> (C. Agardh) M. J. Wynne	<i>Hydrodilition cruciatum</i> (Bressan) Y. M. Chamberlain	<i>Hydrodilition farinaceum</i> (J. V. Lamouroux) D. Penrose et Y. M. Chamberlain	<i>Hypoglossum hypoglossoides</i> (Stackhouse) F. Collins et Hervey	<i>Irvinea boergesenii</i> (Feldmann) R. J. Wilkes, L. M. McIvor et Guiry	<i>Jania longifurca</i> Zanardini	<i>Jania rubens</i> (L.) J. V. Lamouroux	<i>Jania virgata</i> (Zanardini) Montagne	<i>Laurencia microcladina</i> Kützing	<i>Laurencia minuta</i> H. Vandermeulen, D. J. Garbarry et M. D. Guiry
Gazi Mağusa		+	+		+	+		+	+	+						+	+	+	+	+	+
Salamis				+	+	+		+	+							+	+	+	+	+	+
Kumyalı				+	+	+										+	+	+			+
Dip Karpaz					+	+	+	+	+	+	+					+	+	+	+	+	+
Girne				+	+	+	+	+	+	+	+					+	+	+	+	+	+
Koruçam					+	+					+					+	+				+
Yeşilirmak						+											+				+

Table 1. Continued

Taxa	Stations
RHODOPHYTA (RED ALGAE)	
<i>Lithophyllum corallinae</i> (P.L. et H.M. Crouan) Heydrich	+
<i>Lithophyllum cystoserrae</i> (Hauck) Heydrich	+
<i>Lithophyllum stictiforme</i> (Areschoug) Hauck	+
<i>Lithothamnion philippii</i> Foslie	+
<i>Lomentaria chylocladella</i> Funk	+
<i>Lomentaria clavellosa</i> (Lighthfoot ex Turner) Gaillon	+
<i>Lophosiphonia cristata</i> Falkenberg	+
<i>Lophosiphonia obscura</i> (C. Agardh) Falkenberg	+
<i>Melobesia membranacea</i> (Esper) J.V. Lamouroux	+
<i>Meredithia microphylla</i> (J. Agardh) J. Agardh	+
<i>Mesophyllum lichenoides</i> (J. Ellis) M. Lemoine	+
<i>Neogoniolithon brassica-florida</i> (Harvey) Sitchell <i>et</i> Mason	+
<i>Neogoniolithon mammulosum</i> (Hauck) Sitchell <i>et</i> Mason	+
<i>Neosiphonia elongella</i> (Harvey) M. S. Kim <i>et</i> I. K. Lee	+
<i>Nitophyllum punctatum</i> (Stackhouse) Greville	+
<i>Palisada perforata</i> (Bory) K.W. Nam	+
<i>Parviphycus pannosus</i> (Feldmann) G. Furnari	+
<i>Peyssonnelia rosa-marina</i> Boudouresque <i>et</i> Denizot	+
<i>Peyssonnelia rubra</i> (Greville) J. Agardh	+
<i>Peyssonnelia squamaria</i> (S. G. Gmelin) Decaisne	+
<i>Peyssonnelia stoechas</i> Boudouresque <i>et</i> Denizot	+
<i>Pheophylum fragile</i> Kützing	+
<i>Polysiphonia atlantica</i> Kapraun <i>et</i> J. N. Norris	+

Table 1. Continued

Taxa	Stations
RHODOPHYTA (RED ALGAE)	
<i>Polysiphonia atra</i> Zanardini	
<i>Polysiphonia brevirostriculata</i> (C. Agardh) Zanardini	
<i>Polysiphonia denudata</i> (Dillwyn) Greville ex Harvey	
<i>Polysiphonia densita</i> (Roth) Sprengel	
<i>Polysiphonia elongata</i> (Hudson) Sprengel	
<i>Polysiphonia fucoides</i> (Hudson) Greville	
<i>Polysiphonia kampsaxii</i> Borgesen	
<i>Polysiphonia opaca</i> (C. Agardh) Moris et De Notaris	
<i>Polysiphonia tenerima</i> Kützing	
<i>Porphyra umbilicalis</i> Kützing	
<i>Ptilothamnion plumula</i> (Dillwyn) Thuret	
<i>Pyropia leucosticta</i> (Thuret) Neefus et J. Brodie	
<i>Ryphidæa incitoria</i> (Clemente y Rubio) C. Agardh	
<i>Sahlingia subinegra</i> (Rosenvinge) Kornmann	
<i>Spermothamnion repens</i> (Dillwyn) Rosenvinge	
<i>Spyridia filamentosa</i> (Wulfen) Harvey	
<i>Spylonema alsidii</i> (Zanardini) K.M. Drew	
<i>Spylonema cornu-cervi</i> Reinsch	
<i>Taenioma nanum</i> (Kützing) Papenfuss	
<i>Titanoderma trochanter</i> (Bory) Benhioune, Boudouresque, Perret-Boudouresque et Verlaque	
<i>Womersleyella setacea</i> (Hollenberg) R. E. Norris	
<i>Wrangelia penicillata</i> (C. Agardh) C. Agardh	

Table 1. Continued

		Stations													
		Taxa													
								CHLOROPHYTA (GREEN ALGAE)							
	Gazi Mağusa		+ +		+ + + +		+								
	Salamis		+ +		+ +										
	Kumyali		+	+ +											
	Dip Karpaz		+ +		+						+ + +				
	Girne		+ +	+ + + + +		+ + + + + + + + + + + + + +									
	Koruçam		+ +		+ +	+								+ +	
	Yeşilirmak		+ +		+									+ +	

Acetabularia acetabulum (L.) P. C. Silva
Anadyomene stellata (Wulfen) C. Agardh
Bryopsis corymbosa J. Agardh
Bryopsis cupressoides J. Agardh
Bryopsis hypnoides J. V. Lamouroux
Bryopsis plumosa (Hudson) C. Agardh
Caulerpa prolifera (Forsskål) J. V. Lamouroux
Caulerpa racemosa (Forsskål) J. Agardh var. *racemosa*
Caulerpa racemosa var. *cylindracea* (Sonder) Verlaque, Huisman *et al.* Bouduouresque
Chaetomorpha aerea (Dillwyn) Kützing
Chaetomorpha linum (O. F. Müller) Kützing
Cladophora coelothrix Kützing
Cladophora dahliatica Kützing
Cladophora glomerata (L.) Kützing
Cladophora laetevirens (Dillwyn) Kützing
Cladophora lehmanniana (Lindenberg) Kützing
Cladophora pellucida (Hudson) Kützing
Cladophora prolifera (Roth) Kützing
Cladophoropsis membranacea (Hofman Bang ex C. Agardh) Borgesen
Codium bursa (L.) C. Agardh
Dasycladus vermicularis (Scopoli) Krasser
Derbesia tenuissima (Moris *et De Notaris*) P. L. *et al.* H.M. Croutan
Didymosporangium repens Lambert

Table 1. Continued

Taxa	Stations
CHLOROPHYTA (GREEN ALGAE)	
<i>Flabellia petiolata</i> (Turra) Nizamuddin	+
<i>Gayralia oxyperma</i> (Kützing) Vinogradova ex Scagel et al.	+
<i>Halimeda tuna</i> (Ellis et Solander) J. V. Lamouroux	
<i>Percursaria percursa</i> (C. Agardh) Rosenvinge	
<i>Phaeophila dendroides</i> (P. L. et H.M. Crouan) Batters	+
<i>Pseudobryopsis myura</i> (J. Agardh) Berthold	
<i>Ulothrix implexa</i> (Kützing) Kützing	
<i>Ulva compressa</i> L.	+
<i>Ulva intestinalis</i> L. <i>f. cylindracea</i> (J. Agardh) M. J. Wynne	
<i>Ulva intestinalis</i> L. <i>f. ramosa</i> (Vinogradova) E. Taşkın	+
<i>Ulva intestinalis</i> L.	
<i>Ulva lactuca</i> L.	
<i>Ulva linza</i> L.	
<i>Uvella lens</i> P. L. et H. M. Crouan	
<i>Umbranula olivascens</i> (Dangeard) Bae et Lee	
Total	17 38 173 106 45 54 108

The most common taxa were Phaeophyceae *Cystoseira* spp., *Dictyopteris polypodioides*, *Dictyota* spp., *Padina pavonica*, *Stylopodium schimperi* and *Sargassum acinarium*, Rhodophyta *Amphiroa cryptarthrodia*, *Callithamnion corymbosum*, *Ceramium ciliatum* var. *robustum*, *Erythrotrichia carnea*, *Ganonema farinosum*, *Haliptilon attenuatum*, *Halopithys incurva*, *Jania rubens*, *Laurencia obtusa*, *Polysiphonia* spp. and *Spyridia filamentosa*, and Chlorophyta *Caulerpa prolifera*, *Caulerpa racemosa* var. *cylindracea*, *Flabellia petiolata* and *Ulva* spp. Rare and small benthic marine algae were also found: *Cladosiphon irregularis*, *Corynophlaea flaccida*, *Dictyopteris lucida*, *Microspongium stilophorae*, *Padina ditristromatica*, (Phaeophyceae), *Botryocladia madagascariensis*, *Botryocladia skottsbergii*, *Ceramium cupulatum*, *Colaconema endophyticum*, *Erythrotrichia rosea*, *Gastroclonium reflexum*, *Laurencia minuta* (Rhodophyta), *Didymosporangium repens*, *Ulva intestinalis* L. f. *cylindracea*, and *Ulva intestinalis* L. f. *ramosa* (Chlorophyta).

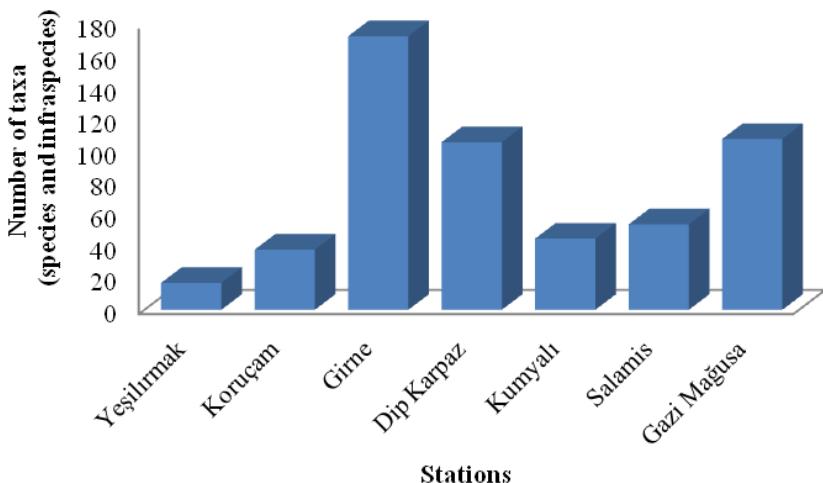


Figure 2. Number of taxa (species and infraspecies) at sampling stations in Northern Cyprus

Cirik *et al.* (2000) reported 135 taxa at species and infraspecies level of the benthic marine algae (27 Phaeophyceae, 83 Rhodophyta, and 25 Chlorophyta) from Northern Cyprus. Therefore, we carried out a detailed algal study of a narrow area along the northern coast of Cyprus, and 107 taxa are reported for the first time for Northern Cyprus.

Kuzey Kıbrıs Bentik Deniz Algleri (Doğu Akdeniz)

Özet

Bu çalışmada Kuzey Kıbrıs'tan bentik deniz alglerinden 242 taksa (tür ve türaltı seviyede) (75 Phaeophyceae, 129 Rhodophyta, and 38 Chlorophyta) rapor edilmektedir. Bunlardan 107 taksa Kuzey Kıbrıs kıyılarından ilk kez için kayıt edilmektedir. Örneklemme Kuzey Kıbrıs'ta yedi farklı istasyondan (Yeşilirmak, Koroçam, Girne, Dip Karpaz, Kumyalı, Salamis ve Gazi Mağusa) 2005 ve 2008 yılları arasında yapılmıştır.

Acknowledgements

This study has been supported by TUBITAK, Ankara, Turkey (104T484). We are grateful to Assoc. Prof. Salih Güçel (Near East University, Northern Cyprus) and Dr. Burak Ali Çiçek (Eastern Mediterranean University, Northern Cyprus).

References

- Abbot, I. A., Hollenberg, G. J. (1976) Marine Algae of California. Stanford University Press, Stanford, California, 844 pp.
- Argyrou, M., Demetropoulos, A., Hadjichristophorou, M. (1999) Expansion of the macroalga *Caulerpa racemosa* and changes in softbottom macrofaunal assemblages in Moni Bay, Cyprus. *Oceanologica Acta* 22: 517-528.
- Aysel, V. (1980) Some of *Polysiphonia* (Rhodophyta, Rhodomelaceae) species in the Aegean Sea coasts of Turkey. In: TUBITAK VII. Science Congress, Kuşadası, Aydin, 841-855 pp.
- Aysel, V. (1997a) Marine flora of the Turkish Mediterranean coast 1. red algae (=Rhodophyta). *Tr. J. Botany* 21: 155-163.
- Aysel, V. (1997b) Marine flora of the Turkish Mediterranean coast 2. brown algae (=Phaeophyceae). *Tr. J. Botany* 21: 329-334.
- Aysel, V., Gezerler, U. Ş. (1996) Marine flora of the Mediterranean coasts of Turkey, 3. Cyanophyceae, Chlorophyceae, Charophyceae and Angiosperma. *Journal of Fisheries and Aquatic Sciences* 13: 1-11.
- Benli H. A., Bilecik, N., Cihangir, B., Katagan, T., Cirik, S., Sayın, E., Kaya, M., Koray, T., Çınar, M. E., Salman, A., Sever, T. M., Ünlüoglu, A., Küçüksezgin, F., Buhan, E., Yılmaz, H., Akalın, S. (1999) Northern Cyprus is a preliminary research on the bio-ecology of marine areas. T.C. Ministry of Agriculture Fisheries Research Institute, B-4: 66 pp. (in Turkish).
- Bressan, G., Babbini, L. (2003) Corallinales del Mar Mediterraneo: guida alla determinazione. *Biol. Mar. Mediterranea* 10: 1-237.

- Brodie, J., Irvine, L. M. (2003) Seaweeds of the British Isles. Volume 1, Part 3B: Bangiophycidae, 167 pp.
- Burrows, E. M. (1991) Seaweeds of the British Isles. Volume 2. Chlorophyta, 238 pp.
- Cirik, S., Aysel, V., Benli, H. A., Cihangir, B., Ünlüoglu, A. (2000) Preliminary studies on the marine vegetation of Northern Cyprus. *Turk. J. Mar. Sci.* 6: 31-40.
- Coppejans, E. (1983) Iconographie d'Algues Méditerranéennes (Bibliotheca Phycologica), Germany, 574 pp.
- Einav, R. (2007) Seaweeds of the Eastern Mediterranean Coast. (ed., A. R. G. Gantner Verlag K. G.), Ruggell Press, Liechtenstein, 266 pp.
- Einav, R., Israel, A. (2008) Checklist of seaweeds from the Israeli Mediterranean: taxonomical and ecological approaches. *Israel Journal of Plant Sciences* 56: 127-184.
- Feldmann, J. (1937) Les algues marines de la Côte des Albères. I-III. Cyanophycées, Chlorophycées, Phéophycées.
- Fletcher, R. L. (1987) Seaweeds of the British Isles, Vol. 3 Fucophyceae (Phaeophyceae), British Museum (Natural History), London, 1-359 pp.
- Furnari, G., Cormaci, M., Serio, D. (2001) The *Luurencia* complex (Rhodophyta, Rhodomelaceae) in the Mediterranean Sea: an overview. *Cryptogarnie, Algol.* 22: 331-373.
- Guiry, M. D., Guiry, G. M. (2013) AlgaeBase. World-wide electronic publication, National University of Ireland, Galway. Available at <http://www.algaebase.org> (accessed 10 Feb. 2013).
- Hamel, G. (1931-1939) Phéophycées de France. Paris.
- Haritonidis, S., Tsekos, I. (1976) Marine algae of the Greek west coast. *Botanica Marina* 19: 273-286.
- Hoffman, R., Shemesh, E., Ramot, M., Dubinsky, Z., Pinchasov-Grinblat, Y., Iluz, D. (2011) First record of the Indo-Pacific seaweed *Codium arabicum* Kütz. (Bryopsidales, Chlorophyta) in the Mediterranean Sea. *Bot. Mar.* 54: 487-495.
- Israel, A., Einav, R., Silva, P. C., Paz, G., Chacana, M. E., Douek, J. (2010) First report of the seaweed *Codium parvulum* (Chlorophyta) in Mediterranean waters: recent blooms on the northern shores of Israel. *Phycologia* 49: 107-112.
- Jongma, D. N., Campo, D., Dattolo, E., D'Esposito, D., Duchi, A., Grewe, P., Huismann, J., Verlaque, M., Yokes, M. B., Procaccini, G. (2013) Identity and origin of a slender *Caulerpa taxifolia* strain introduced into the Mediterranean Sea. *Bot. Mar.* 56 (1): 27-39.

Kurt, O., Taşkin, E., Öztürk, M. (2008) Taxonomy of Red Calcareous Algae Distributed of Northern Cyprus Coasts. In: 8. National Ecology and Environment Congress, 20-23 October 2008, Cyprus.

Mayhoub, H. (1976) Recherches sur la végétation marine de la côte Syrienne. Étude expérimentale sur la morphogenèse et le développement de quelques espèces peu connues. These Sciences naturelles (Doctorat d'Etat). pp. 1-286. Caen, Université de Caen.

Öztürk, M. (1988) Distribution and taxonomy of Cutleriales, Sphaeriales, Scytoniphonales and Dictyotales members from Turkish Aegean and Mediterranean coasts. *Journal of Botany* 12: 154-163 (in Turkish).

Öztürk, M. (1993) Distribution and taxonomy of Chordariales and Sporochnales (Phaeophyta) members from Turkish Aegean and Mediterranean coasts. *Journal of Botany* 17: 237-247 (in Turkish).

Öztürk, M. (1996a). Distribution and taxonomy of Fucales (Phaeophyta) members from Turkish Aegean and Mediterranean coasts. *Journal of Botany* 20: 109-118 (in Turkish).

Öztürk, M. (1996b). Distribution and taxonomy of Punctariales (Phaeophyta) members from Turkish Aegean and Mediterranean coasts. *Journal of Botany* 20: 127-132 (in Turkish).

Öztürk, M., Taşkin, E. (1999) Distribution and taxonomy of Phaeophyta (brown algae) in Iskenderun Gulf (Hatay coasts). In: X. National Fisheries Symposium 22-24 September 1999, Çukurova Univ., Adana, Vol. II: 856-864 (in Turkish).

Öztürk, M., Taşkin, E., Kurt, O., Gucel, S. (2009) Evaluation of algal flora of upper-infralittoral zone from North Cyprus marine ecosystem, (ed., H. Gökçekuş), Proceed. of the Inter. Conference on "The Environment: Survival and Sustainability" Nicosia, TRNC: Educational Foundation of Near East University, 2: 295-303.

Taşkin, E., Öztürk, M., Aysel, V., Kurt, O. (2001) Three new records of the marine algal flora of Turkey. *Turk. J. Bot.* 25: 245-248.

Taşkin, E., Öztürk, M., Kurt, O. (2008b) Alien and invasive marine plants of North Cyprus. In: Proceedings of the 2nd International Symposium on Underwater Research, 20-22 March 2008, Eastern Mediterranean University, Famagusta, TRN Cyprus.

Taşkin, E., Öztürk, M., Kurt, O., Öztürk, M. (2008a) The check-list of the marine algae of Turkey. Ecem Kirtasiye, Manisa, Turkey, 87 pp.

Tsekos, I., Haritonidis, S. (1977) A survey of the marine algae of the Ionian Islands, Greece. *Botanica Marina* 20: 47-65.

Ulcay, S., Taşkin, E., Kurt O., Öztürk, M. (2013) Marine benthic Cyanobacteria in Northern Cyprus (Eastern Mediterranean Sea). *Nova Hedwigia* (submitted).

Verlaque M., Boudouresque, C. F., Meinesz, A., Gravez, V. (2000) The *Caulerpa racemosa* Complex (Caulerpales, Ulvophyceae) in the Mediterranean Sea. *Botanica Marina* 43: 49-68.

Womersley, H. B. S. (1998) The marine benthic flora of southern Australia - Part IIIC. Ceramiales - Ceramiaceae, Dasycladaceae. pp. 1-535. Australian Biological Resources Study and State Herbarium of South Australia, Canberra and Adelaide.

Received: 26.02.2013

Accepted: 15.04.2013