

Antonella Bottalico & Costanza Ilaria Delle Foglie

## Contribution to the knowledge of the benthic marine flora along the eastern coastline of the Gulf of Taranto (Ionian Sea)

### Abstract

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The results of a floristic study along the eastern coastline of the Gulf of Taranto (Ionian Sea) are presented. The list consists of 119 taxa at specific and infraspecific level: 79 *Rhodophyta*, 18 *Phaeophyceae* (*Heterokontophyta*), 20 *Chlorophyta* and 2 *Phanerogams*. Of these, 6 (3 *Rhodophyta*, 2 *Phaeophyceae* and 1 *Chlorophyta*) are newly reported from the Apulian Ionian coasts.

### Introduction

The aim of this study is to give a contribution to the knowledge of the Apulian marine flora of the Ionian Sea, at present limited to a few areas: the seas of Taranto (Piccone 1896; Pierpaoli 1923, 1959; Mastrorilli 1960; Parenzan 1961, 1962, 1969; Pastore 1981; Parenzan 1984; Cecere 1987; Cecere & Perrone 1987-1988; Cecere & al. 1988, 1989; Cecere 1990 a, b; Cecere & Perrone 1990; Cecere & al. 1991 a, b, 1992, 1994; Perrone & Cecere 1994), the Cheradi Islands (Cecere & al. 1995, 1996), the Neretin coast (Solazzi 1967 a, b, 1968; Parenzan 1975; Pardi & al. 1988), S. Cesarea Terme (Huvè & al. 1963; Lazzo & al. 2002).

The research was carried out along the coastline from Capo San Vito to Torre Saturo (eastern littoral of the Gulf of Taranto) (Fig. 1), that had not previously been investigated up to the present from a floristic point of view.

In this area, close to the coastline, the bottom is mainly sandy and muddy, often presenting, towards the open sea, a detritic component of biogenous origin, mostly formed by mollusc shells. Sandy flats are interrupted by many small sandy inlets surrounded by a rocky littoral. At some points, rocky outcrops of variable extension and morphology occur on the bottom. From a geological point of view the rock is plio-pleistocenic, often covered by thin strata of calcarenite (Mastronuzzi & al. 1999).

### Materials and methods

Floristic sampling was carried out, for the whole of 1999, along a number of transects

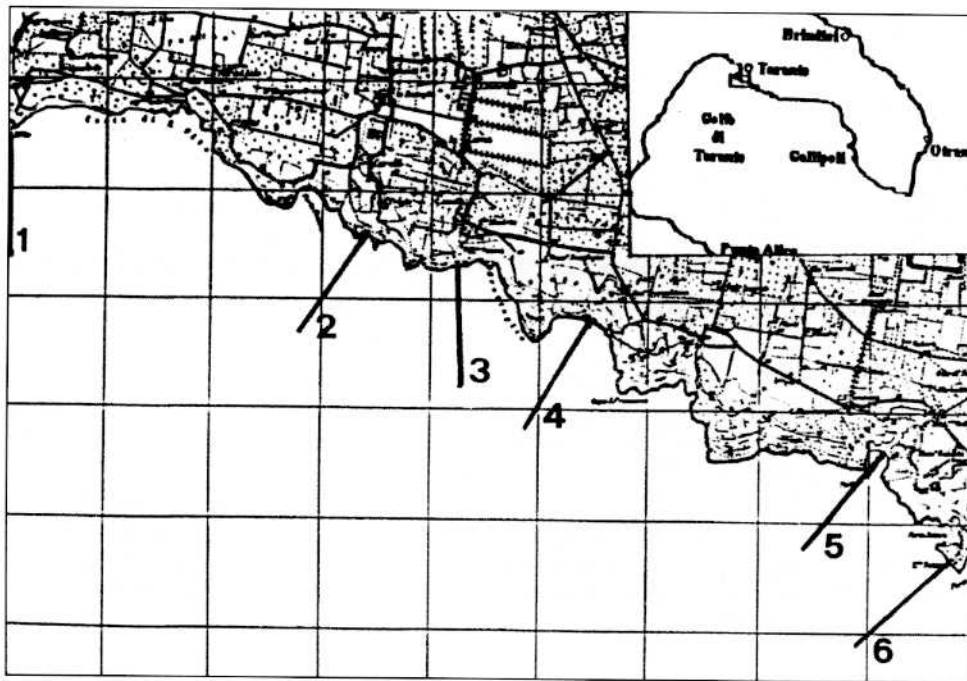


Fig. 1. Location of the 6 sampling sites along the eastern coastline of the Gulf of Taranto (Ionian Sea). 1. Capo San Vito; 2. Contrada Carelli; 3.: Lama; 4. Tramontone; 5. Gandoli; 6. Torre Saturo.

perpendicular to the coastline from the midlittoral zone to a maximum depth of 30 m in 6 sites: Capo San Vito, Contrada Carelli, Lama, Tramontone, Gandoli and Torre Saturo (Table 1). The specimens from the infralittoral zone were collected by SCUBA. An overall number of 111 samples were collected in spring, 105 in summer, 85 in autumn and 82 in winter, for a total of 383 samples.

The material collected was preserved in seawater-formalin (4%) for later study in the laboratory. Dry and wet specimens are held in the Herbarium of the Department of Biology and Plant Pathology, University of Bari (Italy).

Table 1. Sampling sites with indication of transects. Depths are in metres.

	Midlittoral zone			Infralittoral zone					
				Upper				Lower	
Capo San Vito	+0,15	0	-0,15	-0,20	-1	-7		-16	-25
Contrada Carelli	+0,30	0	-0,15	-0,30	-1	-6	-15		-30
Lama	+0,30	0	-0,15	-0,30	-1	-10		-18	-25
Tramontone	+0,30	0	-0,15	-0,30	-1	-4	-13		-30
Gandoli	+0,30	0	-0,15	-0,30	-1	-10			-25
Torre Saturo	+0,15	0	-0,15	-0,30	-1	-8	-15		-30

## Description of sampling sites

### *Capo San Vito*

This low rocky protrusion divides the Mar Grande eastwards from the eastern littoral of the Gulf of Taranto. At some points, the coastline forms a step of a few centimetre tens at sea level. Rocky blocks, subsided owing to erosion phenomena, sometimes emerge from the bottom that slopes gradually down beginning from the tide band and is mainly sandy. Small beds of *Posidonia oceanica* (L.) Delile, thickly covered by epiphytic organisms, occur at a depth of 7 m. The sandy and muddy bottom continues to dip very slowly up to 25 m where other wider beds of *P. oceanica* occur.

### *Contrada Carelli*

A rocky inlet, frontally exposed south-eastwards, occurs along this coastline. The rocky bottom is very irregular, with small hollows and outcrops alternating with sandy spots. Under the shore-line the bottom slopes abruptly down (with a 1-1,5 m step with a vertical wall that is anfractuous and shaded) and continues to dip very slowly, up to a maximum depth of about 6 m in the central part of the inlet and of 12-15 m towards the open sea where it is colonized by small spots of *P. oceanica*. Beyond this level a rocky homogeneous bottom extends up to a depth of 30 m. Also in this station the *Posidonia* fronds are much colonized by epiphytes.

### *Lama*

It is a very small rocky inlet, frontally exposed southwards. The vertical outline of the cliff is more or less steep. It continues to slope down as deep as 3 m and is often eroded at the base. This depth is constant for the whole extension of the inlet that is characterized by a sandy and pebbly bottom, only interrupted by small blocks subsided from the coast.

Outside the inlet the bottom is completely rocky, flat and monotonous, and slopes gradually down as deep as about 25 m. Sandy spots, colonized by small beds of *P. oceanica*, occur at a depth of about 18-20 m.

### *Tramontone*

This rectilinear coastline is frontally exposed west-south-westwards. The emerged rock is about 1 m high at sea level. At some points, under the rocky outline, there is a strip of sand that at low tide or under calm sea conditions, emerges; at other points the depth of the bottom is about 50 cm. There is near the shore-line, in a small sandy inlet, a fresh water spring. The bottom is mainly sandy, with some periodically emerged blocks and outcrops and continues up to 12-15 m. At a low depth the marine phanerogam *Zostera noltii* Hornem occurs and at about 13 m there is a bed of *P. oceanica*. Beyond the *Posidonia* zone a cliff covered by a typical coralligenous biocenosis occurs and this type of bottom continues up to 30 m and over.

### *Gandoli*

This rocky coastline, frontally exposed south-south-westwards is characterized by many small rocky inlets. The vertical outline of the cliff presents a step that reaches an average depth of 50 cm, with many blocks emerging at low tide. The bottom, up to about 10 m is mixed, rocky and sandy; towards the open sea, up to 25 m, spots of *P. oceanica* occur.

*Torre Saturo*

Along this coastline there is a large inlet surrounded by a cliff with caves. The bottom, up to the mouth of the inlet, reaches a depth of 8-10 m, where there is a thick bed of *Z. noltii*. Towards the open sea, at 15-20 m, the bottom is mainly sandy, covered by scattered spots of *P. oceanica*, and continues in a mixture of rock and sand up to 20-30 m.

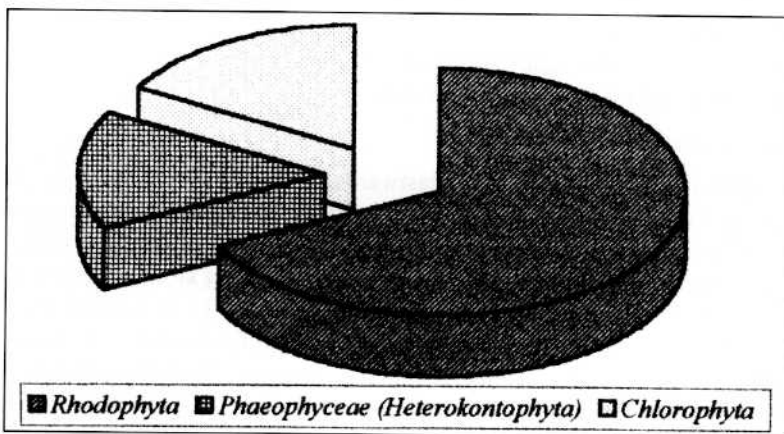


Fig. 2. Percentage distribution of taxa.

### Observations and discussion

Our floristic investigation (Table 2) has led to the identification of 119 specific and infraspecific taxa (later referred to as "species" for expository convenience) comprising 79 *Rhodophyta* (67,5%), 18 *Phaeophyceae* (*Heterokontophyta*) (15,5%), 20 *Chlorophyta* (17,0%) and 2 phanerogams (Fig. 2).

104 species are shared by the Adriatic Sea and the Ionian Sea, 2 species are exclusive to the Ionian Sea; moreover the following 6 species (3 *Rhodophyta*, 2 *Phaeophyceae* and 1 *Chlorophyta*) are new records for the Apulian Ionian coasts:

*Calosiphonia vermicularis* (J. Agardh) F. Schmitz

Recorded from the Tremiti Islands (Cormaci & al. 2000), this species was found at a depth of about 20 m at Torre Saturo in summer. The species was often associated to *Dudresnaya verticillata* (Withering) Le Jolis and *Scinaia furcellata* (Turner) J. Agardh.

*Digenea simplex* (Wulfen) C. Agardh

This species, reported from Trani (Santarelli 1931) and Capo Otranto (Felicini 1965) for the Adriatic Sea, was found only at Contrada Carelli, at a depth of about 20 m.

*Polysiphonia fucoides* (Hudson) Greville

It was found at Tramontone, generally as an epiphyte on *Rytiphlaea tinctoria* (Clemente) C. Agardh, forming dense red-brownish tufts. It was previously reported only from the Gargano promontory (Rizzi Longo & al. 1967).

Table 2. Algal flora of the investigated area. In the column **Chorology**, phylogeographic elements are named according to Cormaci & al. (1982): A = Atlantic; Ab = boreo-Atlantic; Abt = boreo-tropical Atlantic; AP = Atlanto-Pacific; APct = Atlanto-Pacific cold temperate; At = Atlantic tropical; C = Cosmopolitan; CB = Circumboreal; IA = Indo-Atlantic; IAAt = Indo-Atlantic tropical; IAAct = Indo-Atlantic cold temperate; IP = Indo-Pacific; M = Mediterranean; P = Pantropical; SC = Subcosmopolitan. In the column **Taxa** the species which are new to the Apulian coasts of the Ionian Sea are marked •. The occurrence of every species in the 6 investigated sites is marked \*. For the **bathymetric distribution**, the following abbreviations are used: M = Midlittoral zone; ul = upper Infralittoral zone; ll = lower Infralittoral zone; I = upper to lower Infralittoral zone. The **frequency** of findings is indicated by the following abbreviations: vc = very common; c = common; r = rare; vr = very rare. The **seasonal element** is indicated by the following abbreviations: A = Autumn; W = Winter; Sp = Spring; S = Summer.

Chorology	Taxa	Capo San Vito	Contrada Carelli	Lama	Tramontone	Gandoli	Torre Saturno	Bathymetric distribution	Frequency	Seasonal element
RHODOPHYTA										
IA	<i>Aglaothamnion tenuissimum</i> (Bonnemaison) Feldmann-Mazoyer var. <i>tenuissimum</i>			*	*		*	I	r	Sp
IA	<i>Amphiroa fragilissima</i> (Linnaeus) J. V. Lamouroux			*				I	r	A, W, Sp, S
SC	<i>Amphiroa rigida</i> J. V. Lamouroux			*	*	*		I	c	A, W, Sp, S
IA	<i>Antithamnion cruciatum</i> (C. Agardh) Nägeli			*	*			M, I	c	A, W, Sp, S
M	<i>Antithamnion heterocladum</i> Funk				*			II	r	A, W, Sp, S
M	<i>Antithamnion tenuissimum</i> (Hauck) Schiffner				*	*		I	r	A, W, Sp, S
IA	<i>Apoglossum ruscifolium</i> (Turner) J. Agardh					*		II	r	A, W, Sp, S
IA	<i>Callithamnion granulatum</i> (Ducluzeau) C. Agardh			*	*			M, ul	c	A, W, Sp, S
CB	• <i>Calosiphonia vermicularis</i> (J. Agardh) F. Schmitz						*	I	vr	S
AP	<i>Ceramium ciliatum</i> (J. Ellis) Ducluzeau var. <i>ciliatum</i>			*	*			M, ul	r	A, W, Sp, S
M	<i>Ceramium ciliatum</i> (J. Ellis) Ducluzeau var. <i>robustum</i> (J. Agardh) Feldmann-Mazoyer		*		*			M, ul	c	A, W, Sp, S
SC	<i>Ceramium cimbricum</i> H. E. Petersen f. <i>falccidum</i> (H.E. Petersen) Furnari F. et Serio D.					*	*	II	vr	A
IA	<i>Ceramium circinatum</i> (Kützinger) J. Agardh		*					M, ul	r	A, W, Sp, S
SC	<i>Ceramium diaphanum</i> (Lightfoot) Roth				*			M, I	c	A, W, Sp, S
SC	<i>Ceramium virgatum</i> Roth	*	*	*	*	*	*	M, I	vc	A, W, Sp, S
SC	<i>Ceramium tenerrimum</i> (G. Martens) Okamura		*	*	*	*		M, I	c	A, W, Sp, S
C	<i>Champia parvula</i> (C. Agardh) Harvey		*		*			I	r	A, W, Sp, S
Ab	<i>Chondria coerulea</i> (J. Agardh) Falkenberg		*	*	*	*		I	c	A, W, Sp, S
C	<i>Chondrophycus papillosus</i> (C. Agardh) Garbary et J. Harper			*		*		M, ul	r	A, W, Sp, S
At	<i>Chylocladia verticillata</i> (Lightfoot) Bliding		*		*	*	*	I	r	A, W, Sp, S
Ab	<i>Corallina elongata</i> J. Ellis et Solander	*	*	*	*	*	*	M, I	vc	A, W, Sp, S
SC	<i>Crouania attenuata</i> (C. Agardh) J. Agardh			*	*			M, I	c	A, W, Sp, S
IA	<i>Cryptonemia lomation</i> (A. Bertoloni) J. Agardh			*				II	vr	A, W, Sp, S
Ab	<i>Dasya hutchinsiae</i> Harvey				*			M, I	r	A, W, Sp, S

Chorology	Taxa	Capo San Vito	Contrada Carelli	Lama	Tramontone	Gandoli	Torre Saturo	Bathymetric distribution	Frequency	Seasonal element
IA	<i>Dasya ocellata</i> (Grateloup) Harvey		*					I	r	A, W, Sp, S
Abt	<i>Dasya rigidula</i> (Kützing) Ardissonne		*					M, I	r	A, W, Sp, S
P	* <i>Digenea simplex</i> (Wulfen) C. Agardh		*					.II	r	Sp, S
At	<i>Dipterosiphonia rigens</i> (C. Agardh) Falkenberg			*				I	r	A, W, Sp, S
Ab	<i>Dudresnaya verticillata</i> (Withering) Le Jolis			*			*	I	r	A, W, Sp, S
C	<i>Erythrotrichia carnea</i> (Dillwyn) J. Agardh		*		*			M, I	c	A, W, Sp, S
M	<i>Gelidiella nigrescens</i> (Feldmann) Feldmann et Hamel		*		*			I	r	A, W, Sp, S
C	<i>Gelidium pusillum</i> (Stackhouse) Le Jolis			*				M, I	r	A, W, Sp, S
SC	<i>Gelidium spinosum</i> (S. G. Gmelin) P. C. Silva	*	*	*		*		M, I	c	A, W, Sp, S
IAct	<i>Halitilon virgatum</i> (Zanardini) Garbary et H. W. Johansen		*	*		*		I	c	A, W, Sp, S
Abt	<i>Halurus flosculosus</i> (J. Ellis) Maggs et Hommersand			*				I	r	A, Sp, S
Abt	<i>Halydictyon mirabile</i> Zanardini				*			I	r	Sp, S
Abt	<i>Haraldia lenormandii</i> (Derbès et Solier) Feldmann		*					ul	vr	Sp, S
P	<i>Herposiphonia secunda</i> (C. Agardh) Ambronn	*	*	*	*	*	*	M, I	vc	A, W, Sp, S
P	<i>Herposiphonia tenella</i> (C. Agardh) Ambronn		*		*			M, ul	r	W
C	<i>Hydrolithon farinosum</i> (J. V. Lamouroux) Penrose et Y. M. Chamberlain			*	*	*	*	M, I	c	A, W, Sp, S
P	<i>Hypnea musciformis</i> (Wulfen) J. V. Lamouroux		*	*			*	M, ul	vr	A, W, Sp, S
Ab	<i>Hypoglossum hypoglossoides</i> (Stackhouse) Collins et Hervey		*	*	*	*		I	c	A, W, Sp, S
IA	<i>Jania longifurca</i> Zanardini		*		*			ul	c	A, W, Sp, S
C	<i>Jania rubens</i> (Linnaeus) J. V. Lamouroux		*	*	*	*	*	M, ul	c	A, W, Sp, S
C	<i>Laurencia obtusa</i> (Hudson) J. V. Lamouroux		*	*	*		*	M, I	c	A, W, Sp, S
SC	<i>Liagora viscida</i> (Forsskål) C. Agardh			*		*		ul	vr	Sp, S
Ab	<i>Lithophyllum incrustans</i> Philippi			*				ul	vr	Sp, S
IA	<i>Lithophyllum racemus</i> (Lamarck) Foslie				*			II	vr	A, W, Sp, S
IA	<i>Lithophyllum stictaeforme</i> (Areschoug) Hauck						*	II	vr	A, W, Sp, S
IA	<i>Neogoniolithon brassica-florida</i> (Harvey) Setchell et L. R. Mason						*	I	r	A, W, Sp, S
M	<i>Osmundea pelagosae</i> (Schiffner) K. W. Nam	*	*		*		*	I	r	A, W, Sp, S
M	<i>Osmundea verlaquei</i> G. Furnari				*			M, ul	c	A, W, Sp, S
SC	<i>Peyssonnelia polymorpha</i> (Zanardini) F. Schmitz			*				I	r	A, W, Sp, S
IA	<i>Peyssonnelia rubra</i> (Greville) J. Agardh			*	*	*	*	I	r	A, W, Sp, S
M	<i>Peyssonnelia squamaria</i> (S. G. Gmelin) Decaisne	*	*	*	*	*	*	I	c	A, W, Sp, S
Ab	<i>Phyllophora crispa</i> (Hudson) P. S. Dixon			*	*		*	II	c	Sp, S
Ab	<i>Platoma cyclocolpa</i> (Montagne) F. Schmitz						*	ul	r	Sp, S
SC	<i>Plocamium cartilagineum</i> (Linnaeus) P. S. Dixon					*		I	r	A, W, Sp, S

Chorology	Taxa	Capo San Vito	Contrada Carelli	Lama	Tramontone	Gandoli	Torre Saturno	Bathymetric distribution	Frequency	Seasonal element
M	<i>Polysiphonia breviarliculata</i> (C. Agardh) Zanardini	*	*	*	*			ul	vr	A
SC	<i>Polysiphonia denudata</i> (Dillwyn) Greville et Harvey		*				*	l	r	A, W, Sp, S
IA	<i>Polysiphonia elongata</i> (Hudson) Sprengel					*		l	r	A, W, Sp, S
IA	* <i>Polysiphonia fucoides</i> (Hudson) Greville				*			l	r	A, W, Sp, S
APct	<i>Polysiphonia furcellata</i> (C. Agardh) Harvey		*					l	c	A, W, Sp, S
IP	<i>Polysiphonia scopulorum</i> Harvey		*					M, l	r	A, W, Sp, S
Ab	<i>Polysiphonia subulifera</i> (C. Agardh) Harvey				*	*		l	r	A, W, Sp, S
A	<i>Porphyra atropurpurea</i> (Olivier) De Toni	*						M	vr	Sp
SC	<i>Pterosiphonia pennata</i> (C. Agardh) Sauvageau			*				ll	c	A, W, Sp, S
Ab	<i>Rhodophyllis divaricata</i> (Stackhouse) Papenfuss	*	*	*				l	c	A, W, Sp, S
M	<i>Rhodophyllis strafforelloii</i> Ardissonne			*			*	l	vr	Sp
IAt	<i>Rytidhlaea tinctoria</i> (Clemente) C. Agardh		*		*			ll	r	A, Sp
AP	<i>Scinaia furcellata</i> (Turner) J. Agardh	*				*		ul	c	Sp, S
M	<i>Spermothamnion flabellatum</i> Bornet				*			l	r	A, W, Sp, S
Ab	<i>Spermothamnion repens</i> (Dillwyn) Rosenvinge		*	*				l	c	A, W, Sp, S
Ab	<i>Sphaerococcus coronopifolius</i> Stackhouse						*	l	r	A, W, Sp, S
IP	<i>Spongites fruticosus</i> Kützinger				*			ll	r	A, W, Sp, S
C	<i>Spyridia filamentosa</i> (Wulfen) Harvey		*	*	*			l	r	A, W, Sp, S
C	<i>Stylonema alsidii</i> (Zanardini) K. M. Drew				*			M, l	vc	A, W, Sp, S
APct	<i>Thuretella schousboei</i> (Thuret) F. Schmitz					*		ll	vr	W, Sp, S
IAct	<i>Tricleocarpa fragilis</i> (Linnaeus) Huisman et R. A. Townsend			*				ul	vr	A
PHAEOPHYCEAE										
M	* <i>Cladosiphon mediterraneus</i> Kützinger	*		*	*	*		ll	vr	Sp
Ab	* <i>Cladosiphon zosteriae</i> (J. Agardh) Kylin			*	*			ul	vr	Sp
	<i>Cladostephus spongiosum</i> (Hudson) C. Agardh f. <i>verticillatum</i> (Lightfoot) Prud'homme van Reine			*	*			ul	vr	Sp
C	<i>Colpomenia sinuosa</i> (Mertens ex Roth) Derbès et Solier			*	*	*		ul	c	A, W, Sp, S
M	<i>Cystoseira amentacea</i> (C. Agardh) Bory	*	*		*	*	*	ul	c	A, W, Sp, S
IP	<i>Cystoseira barbata</i> (Stackhouse) C. Agardh		*		*			M	c	A, W, Sp, S
Ab	<i>Cystoseira compressa</i> (Esper) Gerloff et Nizamuddin			*	*		*	ul	c	A, W, Sp, S
M	<i>Cystoseira spinosa</i> Sauvageau			*		*		M, ul	c	A, W, Sp, S
C	<i>Dictyopteris polypodioides</i> (A. P. De Candolle) J. V. Lamouroux	*	*	*	*	*		l	r	Sp, S
C	<i>Dictyota dichotoma</i> (Hudson) J. V. Lamouroux var. <i>dichotoma</i>	*	*	*	*	*	*	l	vc	Sp, S
SC	<i>Dictyota dichotoma</i> (Hudson) J. V. Lamouroux var. <i>intricata</i> (C. Agardh) Greville		*					l	c	Sp, S
SC	<i>Dictyota linearis</i> (C. Agardh) Greville			*		*		M, ul	c	Sp, S
SC	<i>Halopteris filicina</i> (Grateloup) Kützinger		*	*	*	*	*	l	r	A, W, Sp, S
P	<i>Padina pavonica</i> (Linnaeus) J. V. Lamouroux	*	*	*	*	*	*	M, l	vc	A, W, Sp, S



Chorology	Taxa	Capo San Vito	Contrada Carelli	Lama	Tramontone	Gandoli	Torre Saturo	Bathymetric distribution	Frequency	Seasonal element
C	<i>Scytosiphon lomentaria</i> (Lyngbye) Link					*		ul	c	Sp, S
SC	<i>Sphacelaria cirrosa</i> (Roth) C. Agardh			*	*			M, I	r	Sp, S
SC	<i>Stypocaulon scoparium</i> (Linnaeus) Kützing	*	*	*	*	*	*	I	c	A, W, Sp, S
IA	<i>Taonia atomaria</i> (Woodward) J. Agardh			*				I	r	Sp, S
CHLOROPHYCEAE										
IA	<i>Acetabularia acetabulum</i> (Linnaeus) P. C. Silva					*		ll	c	Sp, S
AP	<i>Bryopsis plumosa</i> (Hudson) C. Agardh		*					ul	vr	Sp, S
P	<i>Caulerpa prolifera</i> (Forsskål) J. V. Lamouroux		*				*	ll	r	Sp, S
SC	<i>Cladophora glomerata</i> (Linnaeus) Kützing				*			M, ul	r	A, W, Sp, S
IA	* <i>Cladophora lehmanniana</i> (Lindenberg) Kützing	*		*		*	*	M, I	c	Sp, S
IA	<i>Cladophora pellucida</i> (Hudson) Kützing		*	*	*	*	*	M, I	c	A, W, Sp, S
IA	<i>Cladophora prolifera</i> (Roth) Kützing			*				I	c	A, W, Sp, S
AP	<i>Cladophora rupestris</i> (Linnaeus) Kützing			*	*	*		I	r	A, W, Sp, S
Abt	<i>Codium bursa</i> (Linnaeus) C. Agardh	*	*	*	*	*		I	vc	A, W, Sp, S
IP	<i>Codium effusum</i> (Rafinesque) Delle Chiaje					*		I	r	Sp, S
At	<i>Dasycladus vermicularis</i> (Scopoli) Krasser		*	*	*	*	*	I	vc	A, W, Sp, S
SC	<i>Derbesia tenuissima</i> (Moris et De Notaris) P. et H. Crouan				*			I	r	A, Sp, S
At	<i>Flabellia petiolata</i> (Turra) Nizamuddin		*	*	*	*	*	I	vc	A, W, Sp, S
P	<i>Halimeda tuna</i> (J. Ellis et Solander) J. V. Lamouroux	*	*	*	*	*	*	I	vc	A, W, Sp, S
C	<i>Ulva compressa</i> Linnaeus	*						M, ul	c	A, W, Sp, S
C	<i>Ulva intestinalis</i> Linnaeus			*				M, ul	vc	A, W, Sp, S
C	<i>Ulva laetevirens</i> Areschoug	*	*		*			M, ul	c	A, W, Sp, S
C	<i>Ulva linza</i> Linnaeus		*					I	vr	W
P	<i>Valonia macrophysa</i> Kützing			*				ll	r	Sp, S
P	<i>Valonia utricularis</i> (Roth) C. Agardh			*	*	*	*	M, I	r	Sp, S

#### *Cladosiphon mediterraneus* Kützing

It was previously recorded only from the Tremiti Islands (Cormaci & al. 2000). Samples of *C. mediterraneus* were collected at Capo San Vito, Tramontone, Gandoli and Torre Saturo in the lower infralittoral zone, only in spring.

#### *Cladosiphon zosterae* (J. Agardh) Kylin

This species was previously reported from the Tremiti Islands (Cormaci & al. 2000) and from Brindisi (Cormaci & Furnari 1991). Our samples were collected in spring at Lama and Tramontone.

#### *Cladophora lehmanniana* (Lindenberg) Kützing

It was found at Capo San Vito, Lama, Gandoli and Torre Saturo, often as an epiphyte on *Halopteris filicina* (Grateloup) Kützing or as a pleustophyte together with *Enteromorpha intestinalis* (Linnaeus) Nees. It was previously recorded from the Tremiti



Table 3. Percentage distribution of the taxa in the four seasons.

TAXA	SEASONS			
	Autumn	Winter	Spring	Summer
<i>Rhodophyta</i>	76,47	75,61	66,67	67,62
<i>Phaeophyceae</i> ( <i>Heterokontophyta</i> )	9,41	9,76	16,21	14,29
<i>Chlorophyta</i>	14,12	14,63	17,12	18,09

Islands (Cormaci & al. 2000), Brindisi (Cormaci & Furnari 1991) and the Gargano promontory (Cecere & al. 2000).

According to the paper containing the check-list of the benthic marine macroalgae from Apulia by Cormaci & al. (2001), along a coast 800 km long have been to date reported 570 taxa at specific and infraspecific level comprising 361 *Rhodophyta*, 113 *Phaeophyceae* and 96 *Chlorophyta*.

Along our investigated area, that is 10 km long and represents 1,2% of the whole Apulian coast, about 20,5% of the species previously reported from Apulia were found. The number of the species forming this flora could seem quite low, but it is justified by the substratum type.

The flora consisted of 85 species in autumn, 82 in winter, 111 in spring and 105 in summer. The percentage distribution of the taxa in the four seasons is reported in Table 3.

Very rare species constitute 16% of the flora (19 species), as they were found only in 1-4 samples; 48 species (41%) were found in 5-15 samples, whereas 39 species (33%) were found in more than 15 samples. Only 11 species may be regarded as extremely common, as they were found in 25-30 samples.

Biogeographically, the flora is characterized by a high incidence (46,15%) of the Atlantic element, followed by the Cosmopolitan (30,77%). A lower incidence is instead shown by the Mediterranean (11,11%), the Pantropical (7,69%), the Indo-Pacific (3,42%) and the Circumboreal elements (0,86%) (Fig. 3). This spectrum differs, mostly for the Mediterranean (lower percentage) and the Pantropical elements (higher percentage), from that one recently determined by Giaccone (1999) for the benthic marine macroflora from

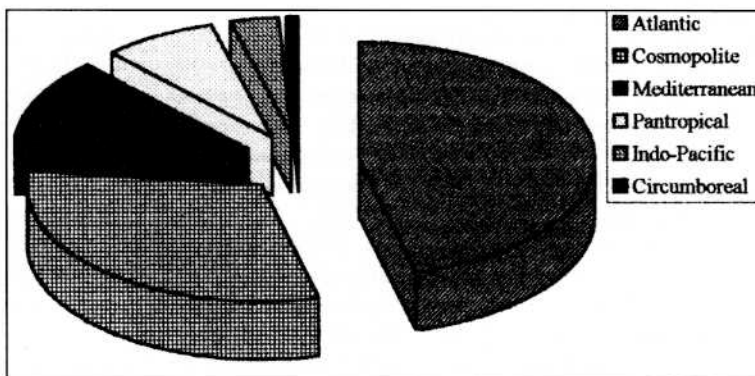


Fig. 3. Percentage of taxa for each geographic area.

the Italian coasts (Atlantic 44,32%, Mediterranean 25,64%, Cosmopolitan 20,65%, Indo-Pacific 4,90%, Pantropical 3,09% and Circumboreal 1,40%).

The R/P (*RhodophyalPhaeophyta*) Index value, calculated by Cormaci & al. (2001) for the whole Apulian marine flora is 3,25. The present flora has an R/P of 4,39, which is much higher and very close to the value of 4,36 reported from S. Cesarea Terme (Le), the limit area between the Ionian and the Adriatic Sea (Lazzo & al. 2002). According to Feldmann (1937), such a high value is indicative of nearly tropical characteristics of the flora. Indeed the investigated area is part of the central zone of the western Mediterranean Sea (Peres & Picard 1964) which usually shows algal populations with subtropical characteristics. As previously reported by Cormaci & al. (2001) the Apulian flora generally shows affinities with floras of southern areas like Linosa Island, Lampedusa Island and Tunisia (Cormaci & al. 1997).

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Addresses of the authors:

Antonella Bottalico\* & Costanza Ilaria Delle Foglie\*\*, Dipartimento di Biologia e Patologia Vegetale, Università di Bari, Campus, via E. Orabona 4, 70125 Bari, Italy.

(\*)Email: bottalico@botanica.uniba.it

(\*\*)Email: ilaria@botanica.uniba.it