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Classification and biogeographical affinities of marine algae in the Ionian Sea

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RESUME: La flore marine des côtes occidentales de la Grèce a été etudié dans le cadre d'explorations scientifiques par Bory de Saint Vincent, 1832, 1838 et Giaccone 1968. Tsekos et Haritonidis (1977) ont effectué une étude de la flore marine des îles de la mer Ionième. Aussi sur les côtes occidentales de la Grèce, Haritonidis et Tsekos (1978) ont etudié la flore marine sur 11 biotopes. Une recherche similaire a été effectué dans le cadre du programme de l'étude ecologique de la region sur 14 stations

Studies on the marine flora of the West Greek coasts have been occasionally conducted in the wake of more general exploratory and scientific expeditions (Bory de Saint Vincent 1832, 1838, Giaccone 1968). Tsekos and Haritonidis (1977) have also contributed with relative research work on marine flora of the west coasts in 11 biotopes. Similar researches are also encouraged by a general programm of N.C.M.R. (National Centre for Marine Research) concerning the marine ecological survey of the area and cover 14 stations (Fig. 1).

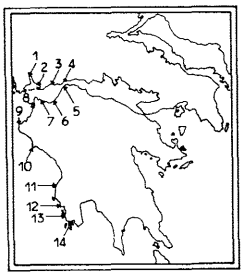

Fig.1. Map of Greek West coasts showing the investigated localities.

Systematic classification, geographical as well as seasonal distribution of marine macrophyceae developing in photophile and sublittoral regions of hard substrates have been studied as regards the West Greek coasts. Apart from its systematic and phytogeographical character this study also aims at the classification of marine plant taxa into ecological groups and biogeographical elements. Samples were taken from an area of 400 cm and from depths ranging between 0.5 and 1m. All marine plant organisms were extracted by means of a hammer and chisel in the frame. Sample collection were done in 14 stations along the coasts of West Peloponnese and central Greece in the summer. During sample determination, 178 algal species were found belong to the following large systematic groups: 33 species to Phaeophyceae 9 to Chlorophyceae, 25 to Bryopsidophyceae and 109 to Rhodophyceae. 3 Spermatophytes have also been defined

Having compared many phycological papers, we classified the defined algae to 7 biogeographical elements. Any alga, which due to luck of bibliography, could not take a place in some floristic element.

In the region of our interest the ratio R/P=3.30 shows its subtropical character. These results are in agreement with the study on the biogeographical affinity between species of the area where the largest number of them belongs to the Atlantic tropical, Atlantic subtropical and Mediterranean chloristic element.

Based on a good deal of papers, we were able to find the ecological groups most of the determined algae belong to. Those which could not fall into an ecological group on account of missing evidence were considered as different. Seven ecological groups or supergroups have been observed to which species belong.

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B-II1

Accumulation of fouling organisms relevant to the water conditions of Alexandria Eastern Harbour

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Rate of accumulation of fouling organisms formed on PVC substrate immersed in Alexandria eastern harbour water were investigated during 1987 and the common fouling organisms present were recorded. Also, the relation between the fouling and hydrography of the water are discussed.

Introduction: Little attention was given to the problems of the ecological conditions of marine fouling organisms in the water harbour since Megally (1970). The harbour receives huge amounts of untreated sewage and waste water through many outfalls, which change its water composition. The increase of oxidizable organic matter together with high temperature, salinity and nutrient salts over the year make the region favorable for the preponderance of fouling organisms.

Material and Methods: Twelve water samples were collected seasonally from four stations at the surface, 1.5 m and at the bottom during 1987. The parameter pH, temperature, transparency, oxidizable organic matter salinity, and the nutrient salts: phosphate, nitrite, nitrate and ammonia were determined according to standard method of oceanography. The accumulation of fouling organisms was followed by panel exposure test: PVC panels were hanged in frames and immersed horizontally and vertically to 30 and 150 cm below the water surface and the wet weight of fouling were recorded every one or two months according to the accumulation of organisms.

Results and Discussion: The increase of bulk of the fouling depends on the rate of growth of the attached individuals which differ from species to species and is controlled by the temperature of water availability of suitable food, salinity, pollution and distance from shore.

The oxidizable organic matter in the E.H. ranged between (1.46-3.92 mg O_2/l) during spring and reached an average of 1.3 mg O_2/l during winter as a result of sewage pollution and self purification process (El-Awady and Ghanem 1975). The annual surface water temperature was 21.9°C and ranged between a minimum of 16.1 and maximum of 28.2°C. This condition is essential for growth of common components of fouling organisms as algae and tube worms which are present in the harbour water during most of the year. The average salinity 38‰ enhances the presence of barnacles. Presented values of all nutrients exceed those in the open sea. They are of the basic links in the feeding chain of marine biota. An increase in nutrient quantities causes intensified biological production by which primary organic matter may be formed through photosynthesis and serves as food source of marine animal. Low nitrite and rather high ammonia values are indicative of their fast bioregeneration owing to the intensive primary production in these area.

Table (1). Seasonal average value of different studied parameters in Alexandria eastern harbour (1987).

Season	Transparency cm	Temp °C	S‰	Oxidizable org. matter mg $O_2 l^{-1}$	DO m $l O_2 l^{-1}$	PO_4-p	NO_3-N	NO_2-N	NH_3-N
						µg. at l^{-1}			
Winter	283	16.1	38.12	1.30	7.09	0.67	0.23	0.24	0.84
Spring	188	23.3	38.05	1.79	1.79	0.88	0.55	0.71	6.42
Summer	69	28.3	37.26	0.16	3.03	0.68	0.55	0.34	2.05
Autumn	178	15.5	37.17	0.022	3.50	0.08	6.80	0.90	0.12

Table (2). Common fouling organisms, settlement period and weight of accumulated organisms.

Common fouling organisms					Settlement period	Wet weight mg/cm²/day	
Tube worms	Barnacles	Ascidians	Bryozoans	Algae		H	(V)*
"	--	--	--	Ulva lactuca Enteromorpha compressa, Enteromorpha linza	5.04.1987 5.05.1987	4	
"	"	"	"	Ulva lactuca Enteromorpha intestionalis	5.04.1987 7.06.1987	86	(52)
"	"	"	"	Ulva lactuca	5.04.1987 12.07.1987	41	(58)
"	"	--	Bugula neritina	Ulva, Entero-morpha linza	12.07.1987 3.10.1987		(31)
"		--	Bugula neritina		3.10.1987 10.11.1987		(32)
"	"	--	Bugula neritina		10.11.1987 8.12.1987		(21)

*H = horizontal plate, V = vertical plate

Only the identifiable plant and animal fouling organisms are mentioned in Table (2). The untreated sewage and waste water flow into the harbour cause the disappearance of ascidians most of the year.

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