ON THE ECOLOGY OF SEVERAL MEGABENTHIC SPECIES FROM THE SCIAPHILIC ALGAE COMMUNITY (NORTH AEGEAN SEA, GREECE)

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Abstract

This study examines the structure of the dominant megabenthic species from the sciaphilic algae community, spatially. The data were collected with a visual method and the randomly placed frames technique. The analysis of population densities indicated the separation of the sites in three main groups, in relation to substrates' inclination. Most of the examined species were randomly distributed as only *Agelas oroides* and *Leptopsammia pruvoti* showed a contagious pattern, while *Halocynthia papillosa* and *Microcosmus sabatieri* were evenly distributed.

Keywords: megabenthos, infralittoral, Aegean Sea, hard substrate

Introduction

The megabenthos from the sciaphilic algae community owns several species with important economic value; either as food source, e.g. *Microcosmus sabatieri*; or as a source of marine natural products, e.g. sponges of the genus *Agelas, Ircinia, Dysidea*, etc (1). Thus, there is a growing need to collect ecological data, in order to manage and conserve these populations (2). This study examines the spatial structure of the dominant megabenthic fauna from the sciaphilic algae community, in order to create a database appropriate for monitoring these ecosystems.

Materials and Methods

Data collection

Seven coastal stations were set in the North Aegean Sea. After preliminary sampling, the following species were found as dominant and thus quantitatively investigated: the sponges *Chondrosia reniformis, Diplastrella bistellata, Axinella cannabina, Axinella verrucosa, Agelas oroides, Petrosia dura, Dysidea fragilis, Ircinia variabilis*, the scleractinian *Leptopsammia pruvoti*, the bryozoan *Pentapora fascialis* and the tunicates *Halocynthia papillosa* and *Microcosmus sabatieri*. All these species are common inhabitants of the sciaphilic algae, the coralligenous and the semi-dark cave communities (2).

Sampling was carried out by SCUBA diving from 15 to 40 m depth, during summer 1998 and 1999. The investigated species are epibenthic, sessile and large enough, to enable visual (non-destructive) techniques to obtain the data (2). The method of randomly placed frames was applied (3) to estimate population density (1 x 1 m) and spatial dispersion (30 x 30 cm).

Data analysis

Numerical abundances data were analyzed by one-way ANOVA. Ordination techniques were then applied, based on Bray-Curtis similarity (4). The significance of the multivariate results was assessed with ANOSIM, while SIMPER analysis identified the contribution of each species to the overall similarity within a site (4). Morisita's index was calculated to estimate the spatial dispersion, whilst a chi-square test was used to determine the significance of deviation from random (3).

Results and Discussion

One-way ANOVA showed that the numerical abundance is not equally distributed in space, for the majority of the species (Table 1). Non-metric MDS indicates the separation of the sites in three groups (Fig. 1), while one-way ANOSIM confirmed the above discrimination (R: 0.81 p<0.1%). SIMPER analysis showed that the average similarity in-group B reaches 90.4%, while 5 species (L. *pruvoti, A. oroides, D. bistellata, C. reniformis, P. fascialis*) contribute for the overall 65%. The similarity in-group C reaches 80.6%, while 4 species (*A. oroides, D. bistellata, H. papillosa, A. cannabina*) contribute for the overall 62%.

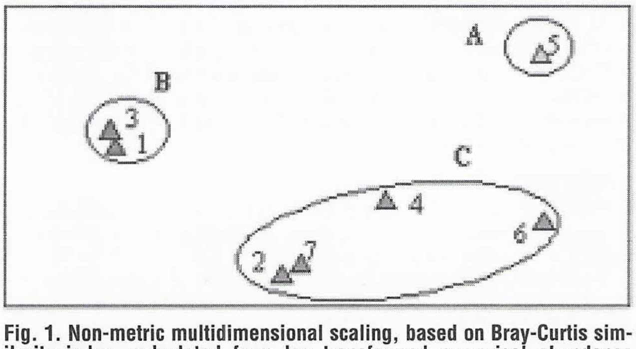

Fig. 1. Non-metric multidimensional scaling, based on Bray-Curtis similarity index, calculated from log transformed numerical abundance data. Stress value: 0.01.

Table 1. Pattern of dispersion (averaged over the sampling sites) of the dominant megabenthic species and one-way ANOVA values (F, p) testing for differences among sites.

Species	Pattern of dispersion	ANOVA	
		F	p
Agelas oroides (Schmidt, 1864)	contagious	28.79	0.000
Axinella verrucosa (Esper, 1794)	random	10.41	0.000
Axinella cannabina (Esper, 1794)	even	10.26	0.000
Chondrosia reniformis Nardo, 1833	random	45.22	0.000
Diplastrella bistellata (Schmidt,	random	12.14	0.000
Dysidea fragilis (Montagu, 1818)	random	7.6	0.000
Ircinia variabilis (Schmidt, 1862)	even	23.39	0.000
Petrosia dura (Nardo, 1833)	random	23.39	0.000
Leptopsammia pruvoti Lacaze-	contagious	1.74	0.20
Pentapora fascialis (Pallas, 1766)	random	45.01	0.000
Halocynthia papillosa (Linnaeus,	even	5.69	0.000
Microcosmus sabatieri Roule, 1885	even	2.32	0.07

Thus, all sites belong to a common community, where the sponges: *A. oroides* and *D. bistellata* are the dominant species. However, three facies were recorded, according to substrates inclination. The first facies was recorded at sites with steep inclination (>80–), i.e. group B; the second one at sites with intermediate inclination (60-80–), i.e. group C; and the third one at a site with slight sloping (55–), where the origin of the substrate was purely organic (dead colonies of *Cladocora caespitosa*), i.e. group A.

The pattern of dispersion was random for the majority of the species (Table 1), with certain exceptions which were the result of either the particular ecological needs of the species, e.g. the sciaphilic nature of *A. oroides* and *L. pruvoti*, which leads to an aggregative pattern (2), or of territoriality e.g. the solitary ascidians, which showed an even dispersion (5).

References

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