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# THE MACROFAUNAL ASSEMBLAGE ASSOCIATED WITH THE SCLERACTINIAN CORAL *CLADOCORA CAESPITOSA* (L.) IN THE AEGEAN SEA

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***Abstract***

Colonies of the Scleractinian *C. caespitosa* were collected from two different sites in the Chalkidiki Peninsula (North Aegean Sea, Greece) in September 1987. The information obtained from multidimensional scaling and analysis of the data revealed a difference in the qualitative and quantitative composition of the associated assemblage between the two sites. Two distinguishable benthic communities exist, due to the different prevailing physicochemical parameters. At the shallow site, crustaceans and molluscs are the dominant taxa, in contrast to polychaetes at the deepest site. At both sites, deposit feeders dominate, with their numbers increasing with depth. In contrast, numbers of suspension feeders decrease with depth.

Key words: *Cladocora caespitosa*, zooxanthellate, Scleractinia, associated fauna, faunal diversity, Mediterranean Sea.

***Résumé***

**La macrofaune associée au scléractiniaire *Cladocora caespitosa* (L.) dans la mer Égée**

Des colonies du scléractiniaire *Cladocora caespitosa* ont été récoltées avec leur faune associée à deux stations de la presqu'île de la Chalcidique (nord de la mer Égée, Grèce), en septembre 1987. Les informations recueillies par la méthode du cadrage multidimensionnel et par l'analyse des données mettent en évidence des différences dans la composition quantitative et qualitative des assemblages associés entre les deux sites. Deux communautés benthiques peuvent être distinguées, du fait des différences entre les paramètres physico-chimiques. Au site le moins profond, les crustacés et les mollusques sont dominants alors que les polychètes sont majoritaires au site le plus profond. Les dépositivores dominent aux deux endroits, leur nombre augmentant avec la profondeur. À l'opposé, les suspensivores voient leur abondance décroître avec la profondeur.

Mots-clés : *Cladocora caespitosa*, zooxanthelle, scleractiniaire, faune associée, diversité faunistique, mer Méditerranée.

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## INTRODUCTION

Many studies have been published on the fauna associated with tropical reef corals (e.g. ABELE, 1976; ABELE & PATTON, 1976; MCCLOSKEY, 1970; CASTRO, 1976; KÜHLMANN, 1984). *Cladocora caespitosa* (Linnaeus, 1767) is a Mediterranean zooxanthellate Scleractinian, forming large colonies with considerable interstitial space, thus expected to have a diversified associated fauna. Information on the factors determining the distribution and the growth pattern of *C. caespitosa* has been given by ABEL (1959), LUMARE (1965), ZIBROWIUS (1980, 1982), SCHUHMACHER & ZIBROWIUS (1985), and VALLS (1989). SCHILLER (1993a, b) has published observations on the distribution, biometry and energy budget of this species, and on the associated community living in the coral.

*Cladocora caespitosa* occurs throughout the Mediterranean (ZIBROWIUS, 1980). Its distribution in the Aegean Sea has been documented by LABOREL (1961), ZIBROWIUS (1979), VAFIDIS (1992), VAFIDIS *et al.* (1996).

Several reasons led us to do this study:

*i)* *C. caespitosa* is unique among Mediterranean Scleractinians by being a colonial zooxanthellate species able to build large colonies and produce solid buildups together with other organisms (KÜHLMANN *et al.*, 1991; KÜHLMANN, 1996);

*ii)* it has occasionally been considered as ecologically close to tropical reef-building corals (SCHUMACHER & ZIBROWIUS, 1985);

*iii)* it is a common species in the North Aegean, which is considered to have a more diversified fauna than other parts of the Eastern Mediterranean (POR & DIMENTMAN, 1989; KOUKOURAS & RUSSO, 1991).

Little information has been available on the fauna associated with the colonies of *C. caespitosa*: LUMARE (1965) reported on 29 species belonging to various taxa in colonies from Crotone (south of the Gulf of Taranto); SCISCIOLI & NUZZACI (1970) listed 29 polychaete species found in colonies from Bari (Italian Adriatic coast); ZAVODNIK (1976) found a dense population of *Ophiothrix fragilis* (50 individuals, in a colony with 15-cm diameter) in the Croatian Adriatic; SCHILLER (1993a) correlated the biomass of the major taxonomical animal groups associated with colonies of *C. caespitosa* in the Bay of Piran (Slovenian Adriatic), with the net coral volume of the colonies; ARVANITIDIS & KOUKOURAS (1994) reported on the polychaetes found in colonies at the Chalkidiki Peninsula (North Aegean Sea).

The purpose of this study was to identify and describe the macrofaunal assemblage associated with the colonies of *C. caespitosa* and to investigate possible differences in the composition of the assemblage at different biotopes.

## MATERIAL AND METHODS

### SAMPLING SITES AND TECHNIQUES

Samples of *C. caespitosa* colonies were collected from two sites *(figure 1)* at 11.00 a.m. Site 1 was located in a small semi-sheltered bay, east of the village of Pirgadikia (40°20′1″N; 23°43′2″E). The rocky bottom in this site was occupied by a facies of a photophilic soft algae assemblage (PÉRÈS, 1982), which is typical of high light intensities (ROS *et al.* 1985). At a distance of 10 m from the coast, the bottom became sandy and was occupied by *Posidonia oceanica* meadows. On September 19th 1987, 7 colonies of *C. caespitosa* (samples 1-7) were collected from the rocky bottom at a depth of 3-5 m (SCUBA diving).

Site 2 was located close to the western coast of the small granite island, Diaporos (40°1′2″N; 23°45′4″E), off the coast of Vourvourou. At a distance of approximately 100 m from the island, the substrate consisted of mixed gravel, sand and silt. This substrate showed some biogene banks at a depth of 15-20 m. Their dimensions were 0.5 × 1.0 × 0.5 m to 4.0 × 5.5 × 3.5 m. The framework consisted mainly of *C. caespitosa* skeletons (KÜHLMANN *et al.*, 1991; KÜHLMANN, 1996). Colonies of *C. caespitosa* were growing on the surface, with a living coverage of 2%. The assemblage occupying these banks was the typical sciaphilic algae community (precoralligenous) which develops under low light intensity in the infralittoral zone (PÉRÈS, 1982; ROS *et al.*, 1985). On September 23rd 1987, 7 colonies of *C. caespitosa* were collected from these banks, at a depth of 15 to 19 m deep (SCUBA diving).

*C. caespitosa* samples were first covered carefully with plastic bags, and then detached with a chisel and a

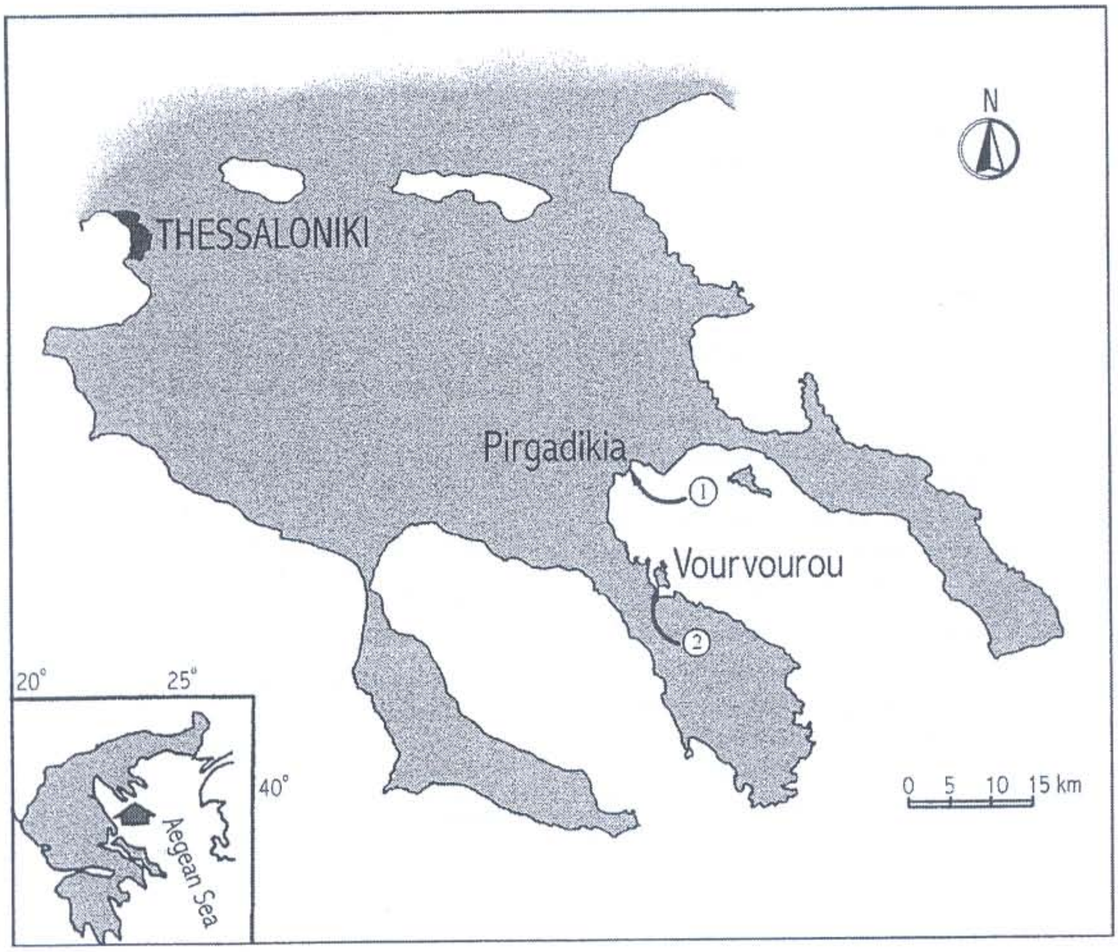


FIG. 1. — Map of Chalkidiki Peninsula (Greece) indicating the two sampling sites.

FIG. 1. — Carte de la Chalcidique (Grèce), avec les deux sites d'échantillonnage.

hammer (KÜHLMANN, 1963). The plastic bags, each containing a single colony, were placed for approximately 10 hours in containers filled with stagnating sea water. The decrease of dissolved oxygen drove out many motile inhabitants. The sea water containing the fauna from the plastic bag was washed through a 1-mm mesh sieve. Then, the colonies were totally broken apart and the animals were washed out with a fine jet of water and collected with fine pipettes, tweezers and brushes. All macro-organisms extracted from the colonies were preserved in 4% formalin solution and sorted, counted and identified to species level at a later stage. Total dry weight (oven-dried for 24 hours at 90 °C) was measured for each taxon. Before the colonies were broken apart (wet but not dripping) their weights had been measured and their volume estimated by water displacement before (skeleton volume) and after (total volume) covering them with thin plastic foil. Thus, the volume of the interstitial space could be determined from the difference between the two volumes, without taking in account the internal porosity of the coral. However, only the total volume of the colonies (including the skeleton volume) was used, as more representative.

At both sites, salinity and temperature of the water column were measured with a WTW LF 196 salinometer. Transparency was estimated using a Secchi disc. Light intensity was measured with an IL 1700 Research Radiometer/Photometer, in order to compare the reduction of light with depth at the two sampling sites.

Feeding types of the dominant species were obtained from the relevant literature (e.g. YONGE, 1954; BULLIVANT, 1968; GREZE, 1968; MCCLOSKEY, 1970; FAUCHALD &

JUMARS, 1979; JUMARS *et al.*, 1982; GASTON, 1987; TAYLOR, 1987; GASTON & NASCI, 1988; GASTON *et al.*, 1988).

## STATISTICAL ANALYSIS

The correlation between total volume and weight of colonies on the one hand, and number of species, of individuals and biomass of macrofauna on the other, was based on the "rank correlation coefficient" or Spearman test (SCHWARTZ, 1963). Species richness (SR), species diversity (H′) and evenness (J′) of the macrofauna assemblage for each sampling site, was calculated according to PIELOU (1969); only part of the colonies sampled at each site was used so that the total volumes were equal. In order to represent the sampling units in two dimensions, multidimensional scaling was employed (FIELD *et al.*, 1982), using the software package PRIMER, developed at the Plymouth Marine Laboratory. Differences in faunal similarity between the two sites were statistically tested with one way ANOSIM (analysis of similarity) test (CLARKE & GREEN, 1988; CLARKE, 1993). This test compares the similarity within groups to that between groups.

# RESULTS

## PHYSICOCHEMICAL CHARACTERISTICS

Site 1: Water temperature was 26.9 °C at the surface and 26.3 °C near the bottom (maximum sampling depth, 5 m). Salinity was 34.5‰ at all depths (euhaline waters). Light with an absolute value of about 2000 µmol photons/($m^2 \cdot s$) just below the surface was reduced to 54% of this value at 1 m depth, to 30% at 3 m and to 21% at 5 m.

Site 2: Water temperature was 27.0 °C at the surface and 24.2 °C at the maximum sampling depth (19 m). At the thermocline (between 9 and 11 m) the temperature was 25.9 °C. Salinity was 34.6 ‰ at the surface and 35.3 ‰ at 19 m. Light, with an absolute value of 2900 µmol photons/($m^2 \cdot s$) under the surface, decreased to 47% of this value at a depth of 1 m, to 4.9% at 15 m and to 2.9% at 19 m. The mean velocity of the tidal current was approximately 5-10 $cm \cdot s^{-1}$.

## COLONIES EXAMINED

The growth patterns of the colonies from sites 1 and 2 corresponded to the ecomorphs *typica* and *astraearia* described by ABEL (1959).

The total skeleton volume of the colonies (both skeleton and interstitial) varied from 460 to 4670 $cm^3$ and their dry weight from 878 to 7280 g. The data for each sample are given in *table I*, together with numbers of species, individuals and biomass values.

Some of the colonies had smaller or wider gaps at the surface or deeper inside, as a result of intense bioerosion by burrowing and boring organisms, which caused detachment of the calices (SCHILLER, 1993a). These gaps were usually occupied by the largest individuals among the colony inhabitants.

TABLE I. — Total volume (V) and dry weight (W) of the colonies (1-7, site 1; 8-14, site 2); total number of species (S), number of individuals (A) and biomass (B) of the associated macrofauna.

TABLEAU I. — Volume total (V) et poids sec (W) des colonies récoltées (1 à 7, site 1 ; 8 à 14, site 2). Nombre total d'espèces (S), nombre d'individus (A), et biomasse (B) de la faune associée.

| *Sampled colonies* | *V ($cm^3$)* | *W (g)* | *S* | *A* | *B (mg)* |
|---|---|---|---|---|---|
| Station 1 | | | | | |
| 1 | 4670 | 7280 | 82 | 688 | 3318 |
| 2 | 1046 | 2060 | 52 | 360 | 1194 |
| 3 | 460 | 1183 | 53 | 202 | 1137 |
| 4 | 2136 | 4536 | 72 | 564 | 2507 |
| 5 | 1440 | 2733 | 71 | 376 | 1870 |
| 6 | 640 | 1135 | 47 | 168 | 593 |
| 7 | 770 | 1257 | 39 | 109 | 341 |
| Station 2 | | | | | |
| 8 | 1000 | 1842 | 68 | 239 | 469 |
| 9 | 1300 | 2397 | 62 | 245 | 863 |
| 10 | 1970 | 3758 | 85 | 648 | 3623 |
| 11 | 1330 | 2836 | 55 | 316 | 1433 |
| 12 | 465 | 878 | 34 | 118 | 170 |
| 13 | 840 | 1341 | 49 | 132 | 221 |
| 14 | 1040 | 1799 | 56 | 201 | 910 |

## COMPOSITION OF THE ASSOCIATED ASSEMBLAGE

The count of organisms associated with the colonies excluded algae and sponges because these were either settled at the base of the colony or occupied surface depressions in areas of dead corallites. Fifteen species of algae and 16 species of sponges were found in small numbers in one or more of the colonies, at sites 1, 2 or both *(table II)*. Some of these and other species extracted from the interstitial spaces of an additional colony, are shown in *figure 2*.

TABLE II. — Epifaunal species of algae and Porifera associated with the colonies examined, but not included in the count.

TABLEAU II. — Espèces d'algues et d'éponges épizoïdes, associées aux colonies examinées, mais non incluses dans le comptage.

| *ALGAE* | *PORIFERA* |
|---|---|
| *Botryocladia botryoides* (Wulfen) J. Feldmann | *Agelas oroides* (Schmidt) |
| *Culteria* sp. | *Cacospongia scalaris* Schmidt |
| *Gelidium latifolium* (Greville) Bornet & Thuret | *Chondrilla nucula* Schmidt |
| *Halimeda tuna* (Ellis & Solander) Lamouroux | *Chondrosia reniformis* (Nardo) |
| *Herposiphonia tenella* (C. Agardh) Ambronn | *Cotricium candelabrum* Schmidt |
| *Jania rubens* Lamouroux | *Dercitus plicatus* (Schmidt) |
| *Jania* sp. | *Dysidea fragilis* (Montagu) |
| *Lithophyllum incrustans* Philippi | *Geodia conchilega* Schmidt |
| *Lithophyllum* sp. | *Ircinia variabilis* (Schmidt) |
| *Lithothamnium calcareum* (Pallas) Areschoug | *Mycale massa* (Schmidt) |
| *Lithothamnium* sp. | *Placortis simplex* Schulze |
| *Padina pavonica* Lamouroux | *Pseudosuberites sulphureus* (Bear) |
| *Sphacelaria* sp. | *Spirastrella cunctatrix* Schmidt |
| *Stypocaulon scoparium* Kützing | *Spongia officinalis* Linnaeus |
| *Udotea* sp. | *Spongia virgultosa* (Schmidt) |
| | *Stryphnus mucronatus* (Schmidt) |

The fourteen colonies yielded 212 macrobenthic taxa, representing 11 phyla. Platyhelminthes, Nemertea, Nematoda, Ostracoda and Bryozoa were represented in each case by only one to four unidentified species *(table III)*. Polychaeta comprised 41.04% (87) of the species, Mollusca 25.00% (53), Crustacea 23.58% (50), the other taxa 10.38% (22). A total of 4366 individuals were collected. Polychaeta accounted for 42.4% (1853) of the individuals, Mollusca for 14.5% (631), Crustacea for 36.1% (1577) and the other taxa for 7.0% (305). Dominance and biomass of the various taxa are given in *figure 3*. The high biomass of "others" is due to the presence of a few large-sized individuals of Sipuncula, Echinodermata, Ascidiacea and Pisces.

## CORRELATIONS BETWEEN COLONIES AND ASSOCIATED ASSEMBLAGE

The data were not all normally distributed. The correlations between total volume or weight of colonies and total number of species (S), individuals (A) and dry weight biomass (B) were positive according to the Spearman test *(table IV)*.

## CLASSIFICATION ANALYSIS

Forty four of the 212 species were considered dominant; these species appeared in all colonies with a frequency over 35%. The number of individuals of these species (listed separately for each sample) are given in *table V*. Multidimensional scaling based on the dominant species resulted in the identification of 2 groups of samples *(figure 4)*, corresponding to sites 1 and 2. The results of the ANOSIM test yielded statistically significant differences for faunal composition between the two groups of samples at the 1.6 level (< 5%). Similar results were obtained when all 212 species were used (significance level of ANOSIM test 1.2%). On the contrary, the corresponding multidimensional scaling for the biomass values, as was tested with ANOSIM test, did not allow the samples to be separated into groups, whether regarding dominant species or the total.

The main biological parameters of the two sample groups corresponding to sites 1 and 2 are summarized in *table VI*. From the data of this table, it is obvious that, at site 2, the associated macrofauna has a considerably higher diversity and greater number of individuals per total volume unit. Of the total number of species found in both colony groups (212 species), 50% (106 species) were co-

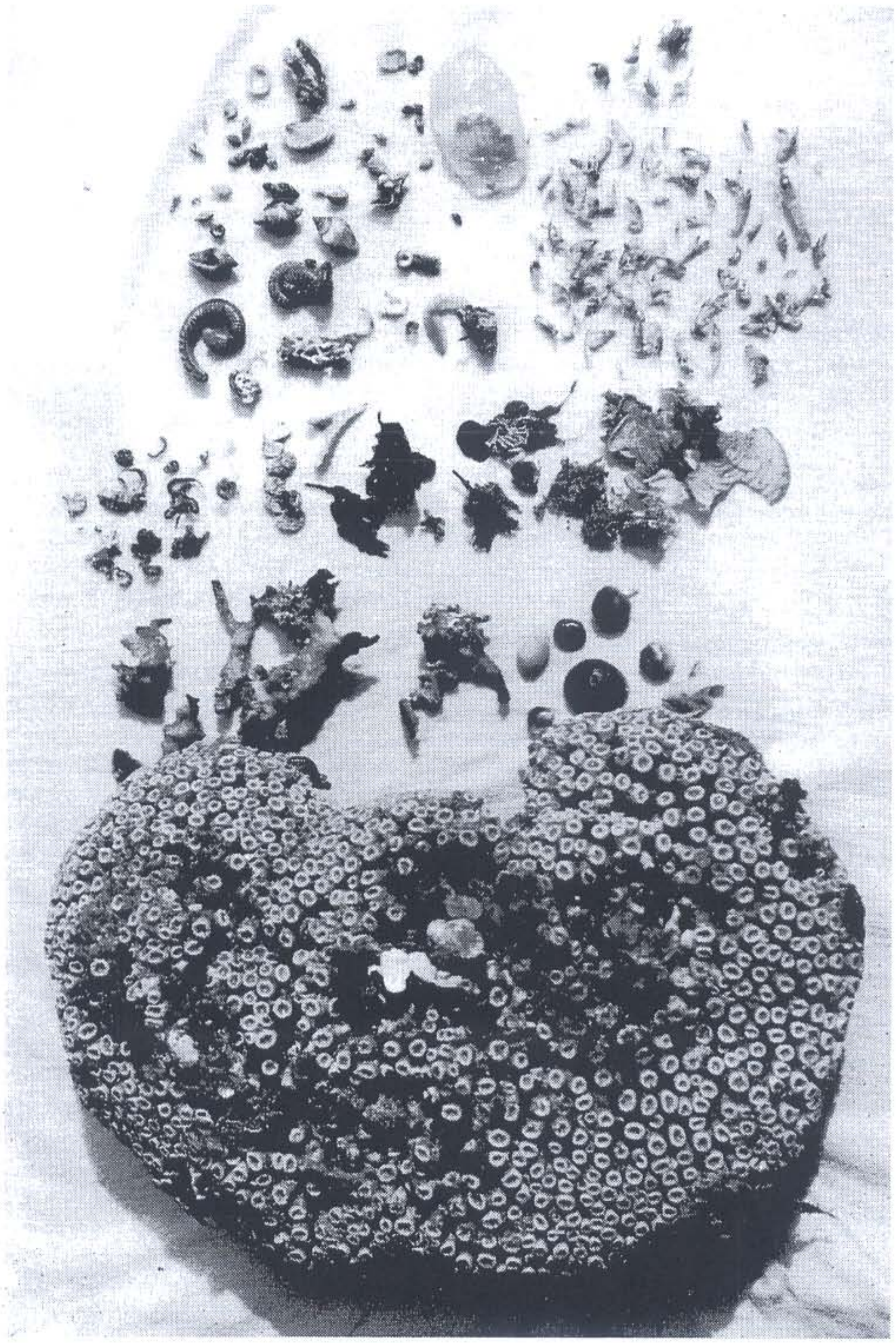

FIG. 2. — A colony of *Cladocora caespitosa* and some of the associated organisms, including various species of algae and sponges (× 2.2).

FIG. 2. — Colonie de *Cladocora caespitosa* avec quelques-uns des organismes associés, incluant des algues et des éponges (× 2,2).

TABLE III. — Taxonomic list of the species associated with *Cladocora caespitosa* colonies.

TABLEAU III. — Liste taxonomique des espèces associées aux colonies de *Cladocora caespitosa*.

**CNIDARIA**

*Cereus pedunculatus* (Pennant)
*Sertularella polyzonias* Linnaeus

**PLATYHELMINTHES**

Turbellaria-1
Turbellaria-2

**NEMERTEA**

Nemertea-1
Nemertea-2
Nemertea-3
Nemertea-4

**NEMATODA**

Nematoda-1

**ANNELIDA (Polychaeta)**

*Acrocirrus frontifilis* (Grube)
*Amphiglena mediterranea* (Leydig)
*Amphitrite variabilis* (Risso)
*Arabella iricolor* (Montagu)
*Bhawania reyssi* Katzmann, Laubier & Ramos
*Branchiomma bombyx* (Dalyell)
*Branchiomma* sp.
*Ceratonereis costae* (Grube)
*Cirriformia tentaculata* (Montagu)
*Dasybranchus gajolae* Eising
*Demonax branchychona* (Claparède)
*Dodecaceria concharum* Oersted
*Dorvillea rubrovittata* (Grube)
*Euclymene oerstedii* (Claparède)
*Eulalia viridis* (Linnaeus)
*Eumida sanguinea* (Oersted)
*Eunice* sp.
*Eunice torquata* Quatrefages
*Eunice vittata* (Delle Chiaje)
*Euphrosyne foliosa* Audouin & Milne Edwards
*Eupolymnia nebulosa* (Montagu)
*Eupolymnia nesidensis* (Delle Chiaje)
*Eusyllis* sp.
*Glycera tesselata* Grube
*Goniada maculata* Oersted
*Haplosyllis spongicola* (Grube)
*Harmothoe antilopis* McIntosh
*Harmothoe areolata* (Grube)
*Harmothoe spinifera* (Ehlers)
*Heteromastus filiformis* (Claparède)
*Hydroides pseudouncinatus pseudouncinatus* Zibrowius
*Kefersteinia cirrata* (Keferstein)
*Leocrates chinensis* Kinberg
*Lepidasthenia elegans* (Grube)
*Lepidonotus clava* (Montagu)
*Lumbrineris coccinea* (Renier)
*Lumbrineris fragilis* (O. F. Müller)
*Lumbrineris funchalencis* (Kinberg)
*Lumbrineris latreilli* Audouin & Milne Edwards
*Lysidice ninetta* Audouin & Milne Edwards
*Marphysa fallax* (Marion & Bobretzky)
*Nainereis laevigata* (Grube)
*Nematonereis unicornis* (Grube)
*Nephtys* sp.
*Nereis rava* Elhers
*Nereis zonata* Malmgren
*Nerinides* sp.
*Nicolea venustula* (Montagu)
*Notomastus latericeus* Sars
*Notophyllum foliosum* (M. Sars)
*Palolo siciliensis* (Grube)
*Perinereis cultrifera* (Grube)
*Petaloproctus terricola* Quatrefages
*Pherusa* sp.
*Phyllodoce madeirensis* (Langerhans)
*Piromis eruca* (Claparède)
*Placostegus crystallinus sensu* Zibrowius
*Polycirrus aurantiacus* Grube
*Pomatoceros triqueter* (Linnaeus)
*Pontogenia chrysocoma* (Baird)
*Prionospio multibranchiata* Berkeley
*Proceraea aurantiaca* Claparède
*Protula* sp.
*Pseudopotamilla reniformis* (O.F. Müller)
*Pterocirrus macroceros* (Grube)
*Sabella spallanzani* (Viviani)
*Sabellaria spinulosa alcocki* Gravier
*Schistomeringos rudolphi* (Delle Chiaje)
*Sclerocheilus minutus* Grube
*Serpula concharum* Langerhans
*Serpula vermicularis* Linnaeus
*Sphaerosyllis pirifera* Claparède
*Sphaerosyllis* sp.
*Spirobranchus polytrema* (Philippi)
*Syllidia armata* Quatrefages
*Syllis gracilis* Grube
*Terebella lapidaria* Linnaeus
*Thelepus setosus* (Quatrefages)
*Trichobranchus glacialis* Malmgren
*Trypanosyllis zebra* (Grube)
*Typosyllis hyalina* (Grube)
*Typosyllis krohnii* (Ehlers)
*Typosyllis prolifera* (Krohn)
*Typosyllis variegata* (Grube)
*Vermiliopsis infundibulum* (Philippi)
*Vermiliopsis labiata* (O.G. Costa)
*Vermiliopsis striaticeps* (Grube)

**MOLLUSCA**

**Polyplacophora**

*Chiton olivaceus* Spengler
*Lepidopleurus cajetanus* (Poli)

**Bivalvia**

*Anomia ephippium* Linnaeus
*Arca noae* Linnaeus
*Barbatia scabra* (Poli)
*Cardita calyculata* (Linnaeus)
*Chama gryphoides* Linnaeus
*Chlamys varia* (Linnaeus)
*Ctena decussata* (O.G. Costa)
*Galeomma turtoni* Turton
*Gastrochaena dubia* (Pennant)
*Hiatella artica* (Linnaeus)
*Hiatella rugosa* (Linnaeus)
*Lima hians* (Gmelin)
*Lima lima* (Linnaeus)
*Limea loscombi* (G.B. I Sowerby)
*Lithophaga lithophaga* (Linnaeus)
*Striarca lactea* (Linnaeus)

**Gastropoda**

*Alvania mamillata* Risso
*Barleeia unifasciata* (Montagu)
*Bittium latreillii* (Payraudeau)
*Bittium reticulatum* (Da Costa)
*Clanculus corallinus* (Gmelin)

TABLE III. — continued

TABLEAU III. — suite.

*Clanculus cruciatus* (Linnaeus)
*Conus mediterraneus* Hwass *in* Bruguière
*Coralliophila meyendorffii* (Calcara)
*Emarginella huzardii* (Payraudeau)
*Emarginula adriatica* O.G. Costa
*Emarginula sicula* Gray
*Engina leucozona* (Philippi)
*Fissurella nubecula* (Linnaeus)
*Haedropleura septangularis* (Montagu)
*Hypselodoris villafranca* (Cantraine)
*Manzonia crassa* (Kanmacher)
*Monodonta turbinata* (Von Born)
*Monophorus perversus* (Linnaeus)
*Murexsul aradasii* (Poirier *ex* Monterosato ms.)
*Muricopsis cristata* (Brocchi)
*Nassarius incrassatus* (Ström)
*Paradoris indecora* (Bergh)
*Philbertia alternans* Monterosato
*Philbertia cordieri* (Payraudeau)
*Platydoris argo* (Linnaeus)
*Pleurobranchus membranaceus* (Montagu)
*Pollia scacchiana* (Philippi)
*Puncturella noachina* (Linnaeus)
*Pusillina munda* (Monterosato)
*Raphitoma concinna* (Scacchi)
*Raphitoma laviae* (Philippi)
*Raphitoma linearis* (Montagu)
*Rissoina bruguierei* (Payraudeau)
*Tylodina perversa* (Gmelin)
*Vexillum tricolor* (Gmelin)

**CRUSTACEA**

**Ostracoda**

Ostracoda-1

**Amphipoda**

*Aora spinicornis* Alfonso
*Bagatus stebbingi* Monod
*Colomastix pusilla* Grube
*Hyale grimaldii* Chevreux
*Lembos websteri* Bate
*Leptocheirus bispinosus* Norman
*Leucothoe serraticarpa* Della Valle
*Leucothoe spinicarpa* (Abildgaard)
*Leucothoe venetiarum* Giordani-Solka
*Liljeborgia kinahani* (Bate)
*Lysianassa pilicornis* Heller
*Maera inaequipes* (A. Costa)
*Metaphoxus pectinatus* (Walker)
*Microdeutopus anomalus* (Rathke)
*Orchomene humilis* (A. Costa)
*Perioculodes longimanus* (Bate & Westwood)
*Stenothoe tergestina* (Nebeski)

**Isopoda**

*Cymodoce tattersalli* Torelli
*Cymodoce truncata* (Montagu)
*Cymodoce tuberculata* A. Costa
*Gnathia* sp.
*Jaera* sp.
*Paranthura costana* Bate & Westwood

**Tanaidacea**

*Apseudes intermedius* Hansen
*Heterotanais* sp.
*Leptochelia savignyi* (Krøyer)
*Tanais dulongii* (Audouin)

**Decapoda**

*Acanthonyx lunulatus* (Risso)
*Alpheus dentipes* Guérin
*Athanas nitescens* (Leach)
*Cestopagurus timidus* (Roux)
*Clibanarius erythropus* (Latreille)
*Eualus occultus* (Lebour)
*Galathea bolivari* Zariquiey Alvarez
*Galathea intermedia* Lilljeborg
*Galathea squamifera* Leach
*Gourretia denticulata* (Lütze)
*Lysmata seticaudata* (Risso)
*Periclimenes amethysteus* (Risso)
*Periclimenes scriptus* (Risso)
*Pilumnus hirtellus* (Linnaeus)
*Pilumnus spinifer* H. Milne Edwards
*Pisidia bluteli* (Risso)
*Pisidia longimana* (Risso)
*Porcellana platycheles* (Pennant)
*Synalpheus gambarelloides* (Nardo)
*Thoralus cranchii* (Leach)
*Xantho incisus* Leach
*Xantho pilipes* A. Milne Edwards

**SIPUNCULA**

*Aspidosiphon muelleri* Diesing
*Golfingia vulgaris* (Blainville)
*Phascolosoma granulatum* Leuckart

**BRYOZOA**

Bryozoa-1

**ECHINODERMATA**

*Ophiothrix fragilis* (Abildgaard)
*Paracentrotus lividus* (Lamarck)

**CHORDATA**

**Tunicata**

*Ascidia mentula* O.F. Müller
*Halocynthia papillosa* Linnaeus
*Pyura microcosmus* (Savigny)

**Pisces**

*Gobius niger* Linnaeus
*Lepadogaster candollei* Risso
*Ondondebuenia balearica* (Pellegrin & Fage)
*Parablennius zvonimiri* (Kolombatovic)

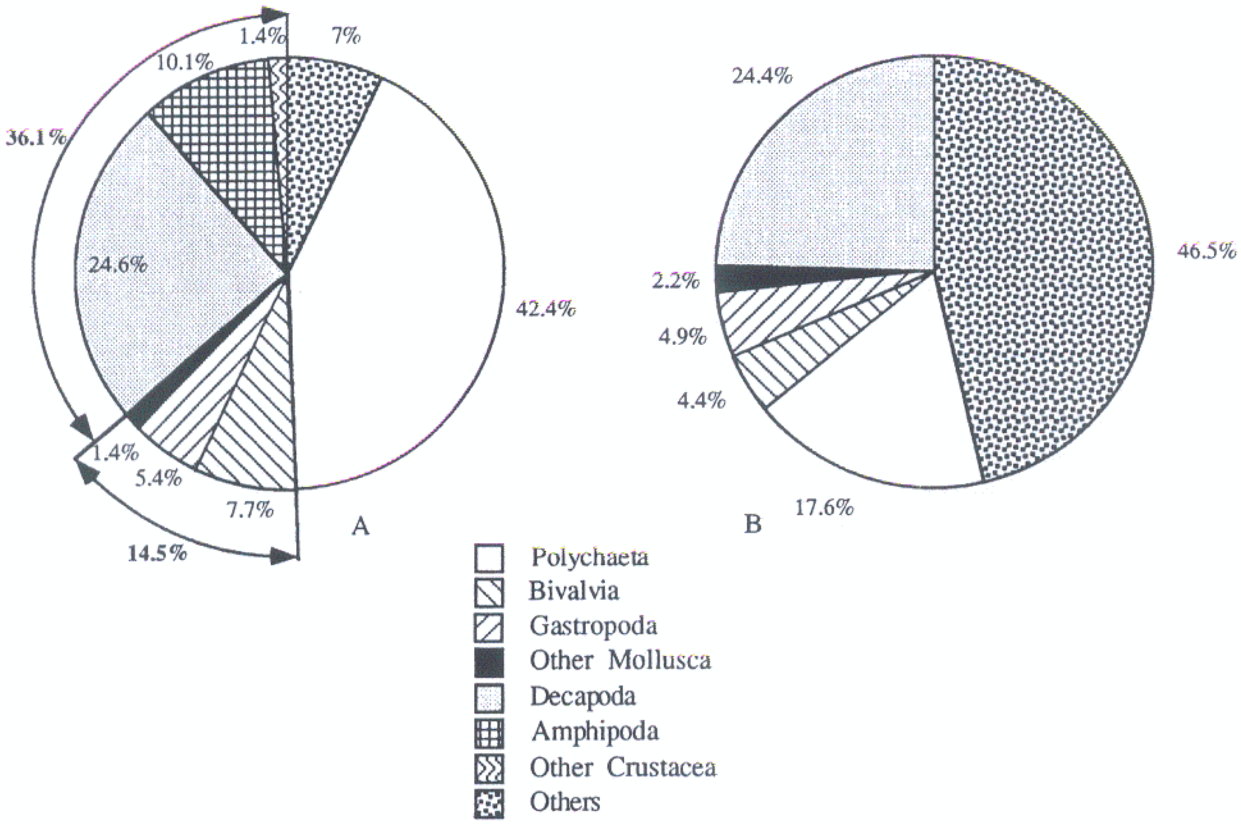


FIG. 3. — Dominances of the main taxa, with regard to numbers of individuals (A) and biomass (B).

FIG. 3. — Dominances des taxons principaux, en termes de nombres d'individus (A) et de biomasse (B).

TABLE IV. — Correlations of total volume and weight of the colonies, with the total number of species (S), individuals (A) and dry weight biomass (B) ($t_{12;0.005} = 3.055$).

TABLEAU IV. — Corrélations entre le volume total ou le poids des colonies, avec le nombre total d'espèces (S), ou d'individus (A), ou bien la biomasse exprimée en poids sec (B) ($t_{12;0.005} = 3.055$).

| | *Colony weight* | *Colony total volume* |
|---|---|---|
| S | $t_T = 6.122$, $t_T > t_{12;0.005}$ | $t_T = 5.4$, $t_T > t_{12;0.005}$ |
| A | $t_T = 7.686$, $t_T > t_{12;0.005}$ | $t_T = 6.614$, $t_T > t_{12;0.005}$ |
| B | $t_T = 5.4$, $t_T > t_{12;0.005}$ | $t_T = 4.875$, $t_T > t_{12;0.005}$ |

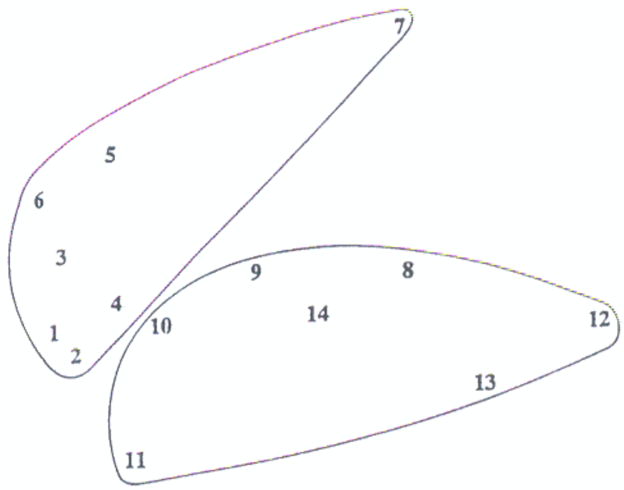


FIG. 4. — Separation of the 14 samples (1-7, site 1; 8-14, site 2) using multidimensional scaling, on the basis of the 45 dominant species.

FIG. 4. — Classement des 14 échantillons (1 à 7, site 1 ; 8 à 14, site 2) à l'aide du cadrage multidimensionnel, basé sur les 45 espèces dominantes.

TABLE V. — List of the associated assemblage dominants with their number of individuals (A) in each sample. 1-7: samples of site 1; 8-14: samples of site 2. The last column indicates the feeding type (FT): M = macrophagous, m = microphagous, S = suspension feeder, D = deposit feeder.

TABLEAU V. — Liste des espèces dominantes des assemblages, avec les nombres d'individus (A) dans chaque échantillon. 1 à 7 : échantillons du site 1 ; 8 à 14 : échantillons du site 2. La dernière colonne mentionne le type alimentaire (FT) : M = macrophage, m = microphage, S = suspensivore, D = déposivore.

| | *Site 1* | | | | | | | *Site 2* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *FT* |
| *Ceratonereis costae* (Grube) | | 2 | 1 | | | | 5 | 8 | 8 | 2 | 14 | 21 | 27 | 9 | mD |
| *Demonax branchychona* (Claparède) | 3 | 2 | | 2 | | | | | 4 | 4 | | | 2 | 1 | mS |
| *Eunice vittata* (Delle Chiaje) | | | 3 | | | 5 | 7 | 1 | 4 | 1 | | 2 | | | mD |
| *Haplosyllis spongicola* (Grube) | 1 | | 1 | 3 | | | | 7 | 7 | 1 | 1 | 6 | 2 | 3 | MD |
| *Harmothoe spinifera* (Ehlers) | 3 | 6 | 1 | 6 | 5 | | 3 | 6 | 2 | 2 | 6 | 3 | 2 | 4 | MD |
| *Hydroides pseudouncinatus pseudouncinatus* Zibrowius | 5 | 17 | 6 | 54 | 4 | 1 | 14 | 5 | 11 | 69 | 28 | | 4 | 17 | mS |
| *Kefersteinia cirrata* (Keferstein) | 3 | 7 | 3 | 2 | 14 | 4 | 2 | 14 | 3 | 9 | 7 | 1 | 4 | 6 | MD |
| *Lepidonotus clava* (Montagu) | 2 | 4 | 2 | 5 | 3 | 4 | | 1 | 4 | 5 | | 1 | 1 | 4 | MD |
| *Lumbrineris coccinea* (Renier) | 3 | 3 | | 2 | 1 | | | 6 | 3 | | 3 | | | | mD |
| *Lumbrineris funchalencis* (Kinberg) | 1 | | 10 | 1 | 2 | | | 1 | 1 | 1 | | | | 2 | mD |
| *Lumbrineris latreilli* Audouin & Milne Edwards | 8 | 4 | 1 | 1 | 2 | 2 | 1 | | 2 | 1 | | | 1 | 1 | mD |
| *Lysidice ninetta* Audouin & Milne Edwards | 2 | 1 | 1 | 5 | | | 1 | 2 | 3 | 4 | 1 | | 2 | 2 | mD |
| *Notomastus latericeus* Sars | 30 | 17 | 3 | 17 | 3 | 1 | | | 5 | 9 | | | | | mD |
| *Polycirrus aurantiacus* Grube | 1 | | 1 | 5 | 1 | 1 | 1 | 5 | 4 | 1 | | 11 | 2 | 5 | mD |
| *Pseudopotamilla reniformis* (O.F. Müller) | 58 | | 2 | 4 | | 2 | 1 | | 21 | 36 | | | 2 | 3 | mS |
| *Serpula concharum* Langerhans | 3 | | | 2 | | | | 2 | 1 | 5 | | 4 | 1 | 12 | mS |
| *Serpula vermicularis* Linnaeus | 9 | 25 | | 47 | | 4 | 4 | 1 | 1 | 7 | 5 | | 1 | 4 | mS |
| *Spirobranchus polytrema* (Philippi) | 7 | 5 | 5 | 8 | 14 | 5 | 3 | 4 | 27 | 31 | | 1 | | | mS |
| *Syllis gracilis* Grube | 12 | 1 | 4 | | | | | | 1 | 1 | 1 | | 2 | 3 | MD |
| *Typosyllis hyalina* (Grube) | 5 | | 2 | | 2 | 2 | 1 | 15 | 4 | 1 | | 9 | 20 | 6 | MD |
| *Typosyllis variegata* (Grube) | 10 | 8 | | 2 | 1 | | | 1 | 3 | 1 | | | 1 | | MD |
| *Vermiliopsis infundibulum* (Philippi) | 3 | 10 | 12 | 47 | 14 | 12 | 14 | 3 | 5 | 4 | 2 | 16 | 1 | 8 | mS |
| *Vermiliopsis striatisceps* (Grube) | 8 | 2 | 2 | 16 | 28 | 1 | 6 | 3 | 2 | 30 | 30 | 1 | 1 | 18 | mS |
| *Lepidopleurus cajetanus* (Poli) | 3 | | | 3 | 27 | | 1 | 2 | 1 | 4 | 2 | 2 | 1 | | mD |
| *Hiatella artica* (Linnaeus) | | | 3 | 1 | | | 1 | | 6 | | | | | 6 | mS |
| *Hiatella rugosa* (Linnaeus) | | 6 | | 3 | 2 | | 4 | | | 4 | 5 | | 12 | | mS |
| *Lithophaga lithophaga* (Linnaeus) | 2 | 2 | 2 | 2 | 4 | | | 4 | | 7 | 1 | | | | mS |
| *Striarca lactea* (Linnaeus) | 40 | 10 | 8 | 47 | 30 | 2 | | | 13 | 21 | 5 | 3 | 1 | 8 | mS |
| *Alvania mamillata* Risso | | | | | 8 | 4 | 6 | 8 | | 3 | 4 | | | | mD |
| *Bittium reticulatum* (Da Costa) | | 20 | 5 | | 3 | 4 | 2 | | 6 | | | | | | mD |
| *Maera inaequipes* (A. Costa) | 116 | 77 | 27 | 41 | 1 | 2 | | 1 | | 75 | 28 | | | | mS |
| *Apseudes intermedius* Hansen | 1 | 6 | 1 | 8 | 1 | 3 | | 1 | | 16 | 1 | | | | mD |
| *Alpheus dentipes* Guérin | 53 | 21 | 9 | 36 | 27 | 13 | | 6 | 7 | 47 | 19 | 3 | 3 | 8 | MD |
| *Athanas nitescens* (Leach) | 76 | 18 | 24 | 60 | 40 | 29 | 1 | 12 | 15 | 60 | 86 | 2 | 4 | 15 | MD |
| *Cestopagurus timidus* (Roux) | 63 | 9 | 14 | 1 | 29 | 18 | | 3 | 5 | 2 | 2 | | | | MD |
| *Galathea bolivari* Zariquiey Alvarez | | | 6 | 1 | 1 | 4 | | | | 8 | | | 2 | | MD |
| *Galathea squamifera* Leach | 4 | 3 | 2 | 2 | | 1 | | | | | 1 | | | | MD |

TABLE V. — continued

TABLEAU V. — suite.

| | *Site 1* | | | | | | | *Site 2* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *FT* |
| *Pilumnus hirtellus* (Linnaeus) | | | | | 5 | | | 3 | 1 | 5 | | | 2 | 1 | MD |
| *Pilumnus spinifer* H. Milne Edwards | 2 | 1 | 1 | 4 | | 4 | | | 1 | 2 | 7 | | | | MD |
| *Thoralus cranchii* (Leach) | 13 | 2 | 3 | 3 | | 1 | | 12 | 4 | 1 | 6 | | | 2 | MD |
| *Xantho granulicarpus* Forest | 2 | 1 | | | 13 | | | | | 1 | 2 | | | | MD |
| *Aspidosiphon muellerii* Diesing | 3 | 1 | 1 | | 3 | | | | 7 | | | | | | MD |
| *Phascolosoma granulatum* Leuckart | 37 | 15 | 16 | 38 | 12 | 5 | | | 6 | 53 | 11 | | | 7 | MD |
| *Ophiothrix fragilis* (Abildgaard) | 4 | 7 | | 14 | | 1 | 2 | 2 | 7 | 2 | 5 | | | 2 | MD |

occurring and consequently 47 and 59 of the species found in the colony groups of sites 1 and 2 respectively, were not found in the other. Among the co-occurring dominant species *(tables V and VI)*, several appeared with considerably different numbers in each of the two colony groups. The mean numbers of individuals/1000 $cm^3$ for 6 of the most characteristic species of this category, are given in *table VI*. These species are included among those having relatively high dominances in one or both colony groups. At site 1, the most dominant species was the amphipod *Maera inaequipes* (10.74%), which also had a relatively high dominance (2.38%) at site 2. At site 2, the most dominant species was the shrimp *Athanas nitescens* (4.44%) which also appears with a high dominance (10.05%) at site 1. In contrast, the polychaete *Ceratonereis costae* was present at site 2 in much greater abundance and higher dominance than at site 1.

The mean biomass per 1000 $cm^3$ total volume *(table VI)* was similar at both sites.

As can be seen from *figure 5*, at site 1, crustaceans are the dominant organisms (46.6%), followed by polychaetes (40.2%), while at site 2 polychaetes are dominant (56.5%), followed by crustaceans (34.4%). Molluscs appear in a smaller percentage at both sites (13.2% at site 1, and 9.1% at site 2). The above percentages for crustaceans, polychaetes and molluscs are significantly different between the two sites ($\chi^2 = 59.36$, $p = 0.999$) The distribution of colony samples (1-7, site 1; 8-14, site 2), according to the percentages of the three above mentioned taxa is given in the triangular graph of *figure 6*. It appears from this figure that samples from the shallower site 1 are distinguished from those from site 2 mainly because of the lower occurrence of polychaetes and the higher occurrence of molluscs at site 1. Sample 7 is an exception, and diverges significantly from the other samples of site 1, since crustaceans are almost absent. The bulk of the samples from site 2 are characterized by a greater polychaete abundance and lower crustacean and mollusc abundance. Samples 10 and 11 also differ from the rest of the samples of site 2, due to their composition.

## OTHER ECOLOGICAL RELATIONSHIPS

It was attempted to investigate the different feeding types occurring in the assemblages of the two sites; the dominant species *(table V)* were characterized according to their feeding method and the size of their food (*table V*, last column): mS = microphagous suspension feeders (including filter feeders), mD = microphagous deposit feeders, MD = macrophagous deposit feeders. It can be seen from *figure 7*, that deposit feeders at both sites occur with a higher percentage than do suspension feeders. At site 1, the former exceed the latter by approximately 12% and at site 2 by 16%. It seems to appear that, at site 2, suspension feeders decrease slightly, while deposit feeders increase slightly. Among deposit feeders, microphagous increase slightly, while macrophagous decrease from site 1 to site 2. However, at both sites, macrophagous are much more numerous than microphagous.

The distribution of specimens from both sites, according to the percentage of the three feeding types present (considering dominant species only) is given in *figure 8*.

TABLE VI. — Biological characteristics of the two colony groups. * = data calculated for an approximately equal colony volume from each colony group.

TABLEAU VI. — Caractéristiques biologiques des deux groupes de colonies. * = données rapportées à un volume de colonie approximativement égal pour chaque groupe de colonies.

| | | *Sample (colony) groups* | |
|---|---|---|---|
| | | *1-7 (Station 1)* | *8-14 (Station 2)* |
| Total number of species: | | 153 | 165 |
| co-occurring | | 106 | 106 |
| co-occurring (%) | | 50 | 50 |
| Mean number of species/colony | | 59.4 | 58.4 |
| Mean number of species/1000 $cm^3$ | | 37.3 | 51.5 |
| Total number of individuals | | 2467 | 1899 |
| Mean number of ind./colony | | 352 | 271 |
| Mean number of ind./1000 $cm^3$ | | 221 | 239 |
| Total biomass (mg) | | 10 960 | 7688 |
| Mean biomass/colony | | 1565.7 | 1098.3 |
| Mean biomass/1000 $cm^3$ | | 981.9 | 967.7 |
| * Mean species diversity (H′) | | 3.76 | 4.13 |
| * Mean species evenness (J′) | | 0.77 | 0.82 |
| * Mean species richness (S) | | 17.84 | 20.90 |
| Mean number of ind./1000 $cm^3$: | *Ceratonereis costae* | 0.7 | 11.2 |
| | *Spirobranchus polytrema* | 4.2 | 7.9 |
| | *Striarca lactea* | 12.3 | 6.4 |
| | *Maera inaequipes* | 23.7 | 13.1 |
| | *Cestopagurus timidus* | 12.0 | 1.5 |
| | *Athanas nitescens* | 22.2 | 24.4 |
| Mean dominance (%) : | *Ceratonereis costae* | 0.33 | 2.04 |
| | *Spirobranchus polytrema* | 1.91 | 1.44 |
| | *Striarca lactea* | 5.55 | 1.17 |
| | *Maera inaequipes* | 10.74 | 2.38 |
| | *Cestopagurus timidus* | 5.43 | 0.27 |
| | *Athanas nitescens* | 10.05 | 4.44 |

Seven of the communities (1, 3, 5, 9, 10, 11, 14), from both sites, overlap.

Among polychaetes *(figure 9)*, suspension feeders dominate, especially at site 1; both microphagous and macrophagous deposit-feeding polychaetes seem to increase from site 1 to site 2; microphagous are more dominant at site 1, macrophagous more so at site 2.

Among the crustaceans *(figure 10)* deposit feeders dominate similarly, likewise at the two sites. Differences in the representation of feeding types between the sites were not significant.

## COMPARISON OF THE ASSOCIATED FAUNA WITH THOSE OF OTHER MEDITERRANEAN AREAS

In *table VII*, the numbers of associated species of the main taxa are compared with those given for polychaetes

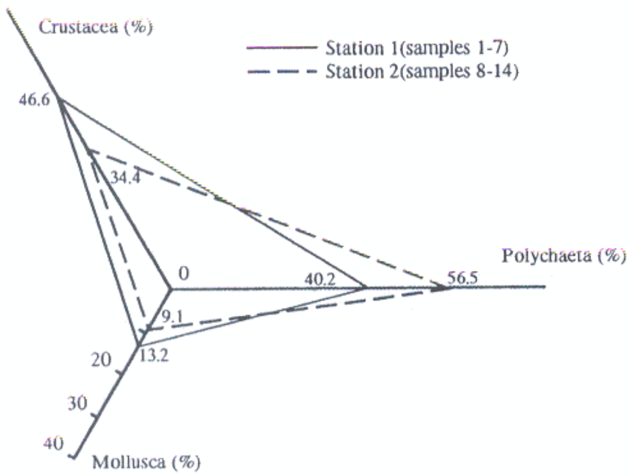


FIG. 5. — Mean percentages of the dominant species of crustacean, polychaete and mollusc groups in the two sites.

FIG. 5. — Pourcentages moyens des espèces dominantes de crustacés, de polychètes et de mollusques aux deux sites d'échantillonnage.

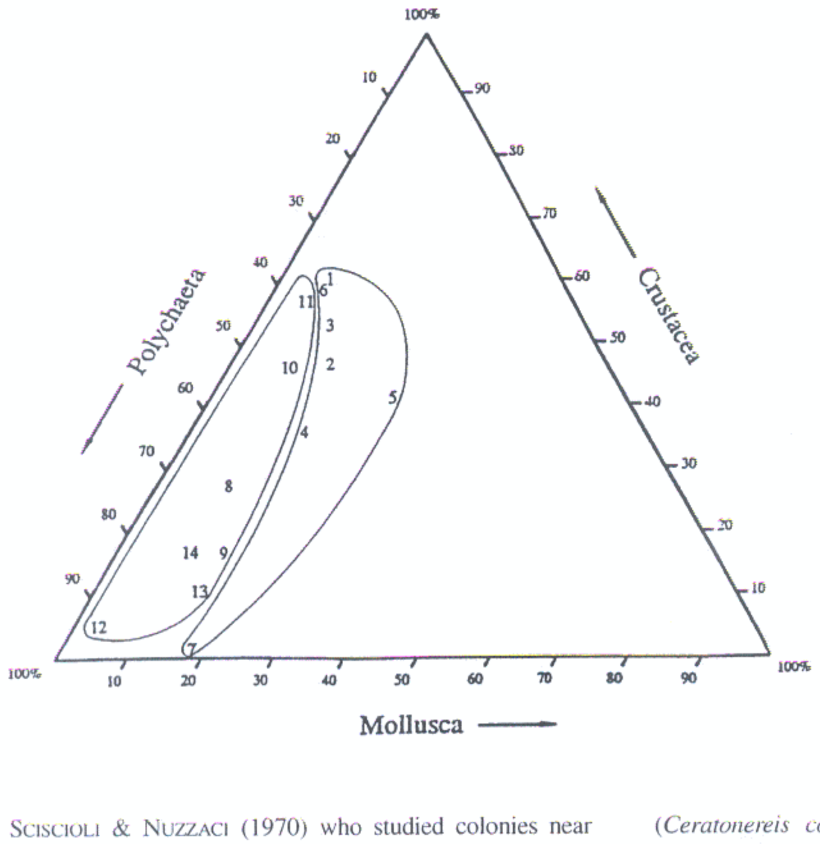


FIG. 6. — Distribution of the samples (1-7 and 8-14) according to the percentages of the dominant crustaceans, polychaetes and molluscs.

FIG. 6. — Distribution des échantillons (1 à 7, et 8 à 14), selon les pourcentages des *espèces dominantes de crustacés, de* polychètes et de mollusques.

by SCISCIOLI & NUZZACI (1970) who studied colonies near Bari (S. Adriatic Sea) and for certain taxa by LUMARE (1965) who studied colonies from the Ionian Sea (Taranto and Squillace Gulfs). For all taxa compared, significantly higher numbers of associated species were found in the colonies from the N. Aegean. Of the 29 associated polychaetes found in S. Adriatic and of the 12 in Ionian Sea, 20 and 5, respectively, were found in the colonies from the N. Aegean. Three of the dominant species in the N. Aegean colonies (*Ceratonereis costae, Serpula vermicularis* and *Typosyllis variegata*) have also been reported from the Adriatic and the Ionian sites. Species from the other taxa co-occurring in the Ionian and the Aegean Sea are comparatively few, but the following are also frequently found in the Aegean colonies: the ophiuroid *Ophiothrix fragilis*, the shrimps *Alpheus dentipes* and *Athanas nitescens*, the amphipod *Maera inaequipes* and the bivalves *Lithophaga lithophaga, Chlamys varia, Anomia ephippium* and *Chama gryphoides*.

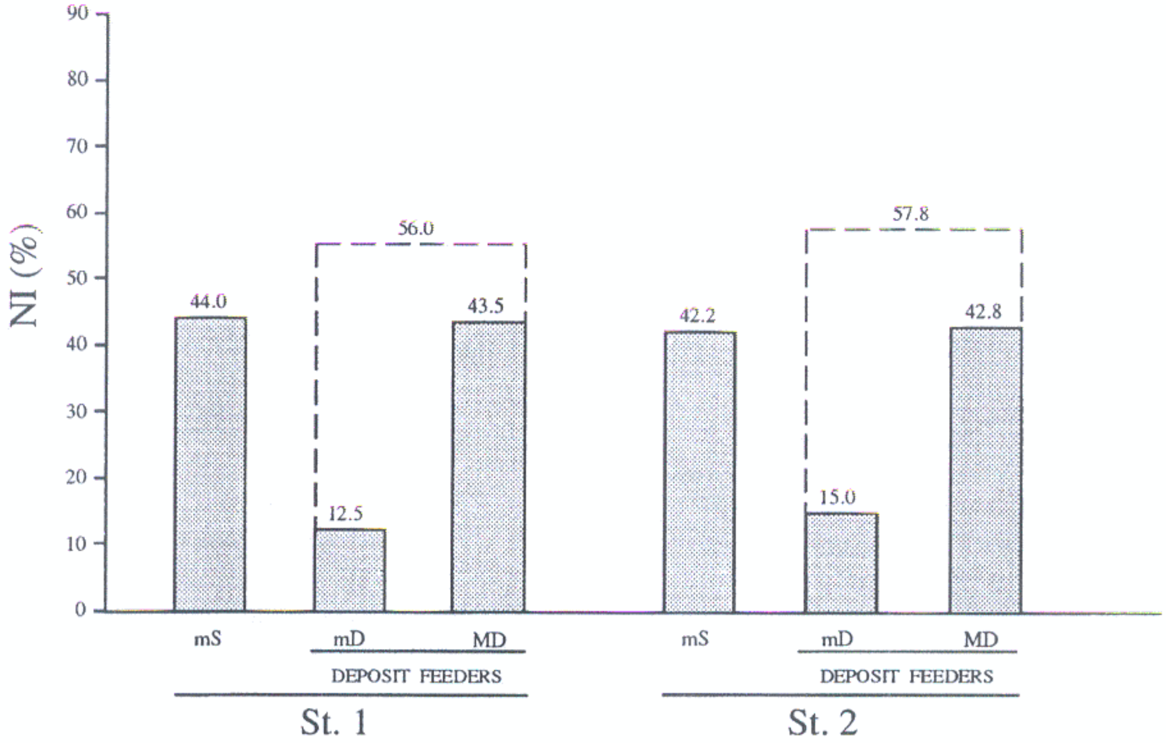


FIG. 7. — Percentages of the 3 selected feeding types, concerning the total number of individuals (NI) of the dominant species in the sampling sites 1 and 2. M = macrophagous, m = microphagous, S = suspension feeders, D = deposit feeders.

FIG. 7. — Pourcentages des trois types alimentaires sélectionnés, selon le nombre total d'individus (NI) des espèces dominantes dans les sites échantillonnés 1 et 2. M = macrophages, m = microphages, S = suspensivores, D = déposivores.

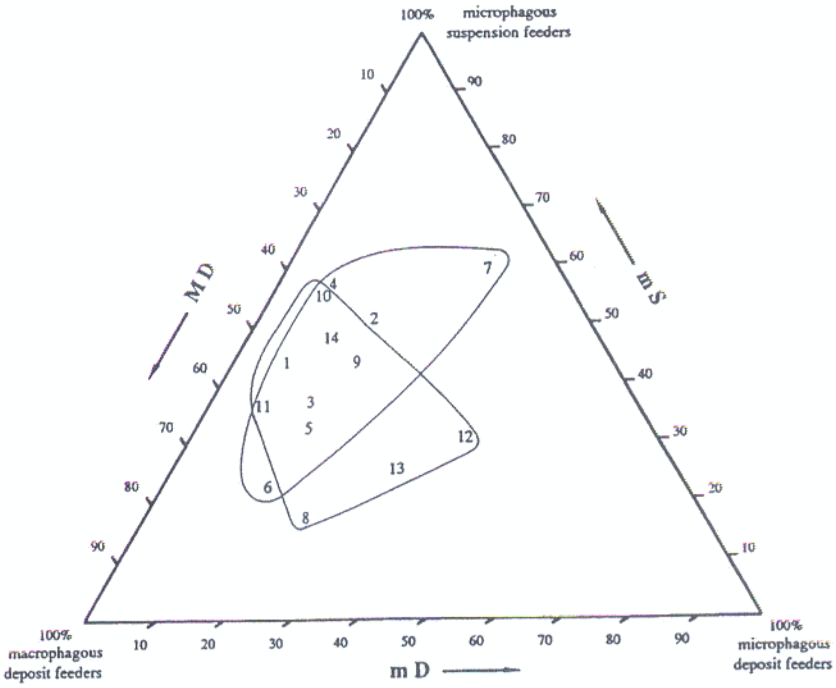


FIG. 8. — Distribution of the samples (1-7 and 8-14) according to the percentages of the three selected feeding types of the dominant species in each sample.

FIG. 8. — Distribution des échantillons (1 à 7, et 8 à 14) selon les pourcentages des trois types alimentaires sélectionnés des espèces dominantes dans chaque échantillon.

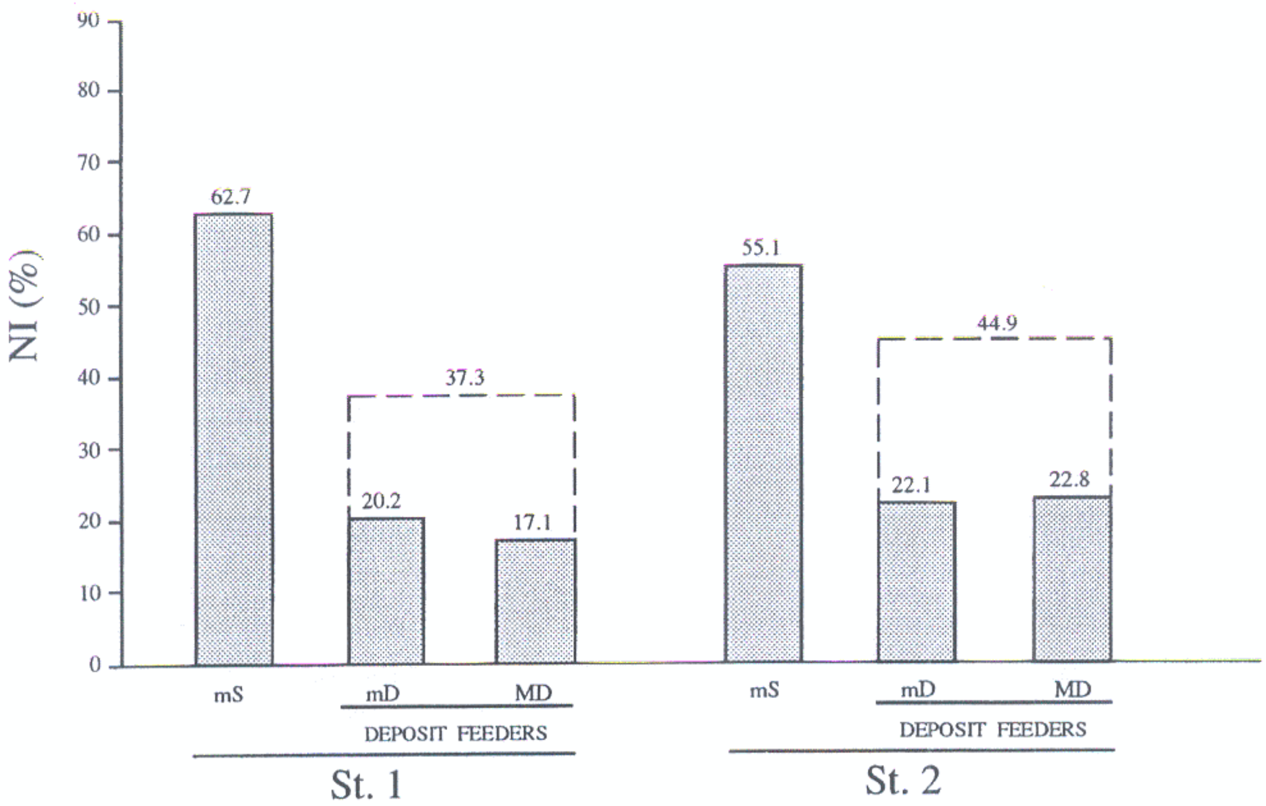


FIG. 9. — Percentages of the 3 selected feeding types concerning the total number of individuals (NI) of the dominant polychaete species in the two sites. M = macrophagous, m = microphagous, S = suspension feeders, D = deposit feeders.

FIG. 9. — Pourcentages des trois types alimentaires sélectionnés, selon le nombre total d'individus (NI) des espèces dominantes de polychètes dans les deux sites échantillonnés. M = macrophages, m = microphages, S = suspensivores, D = déposivores.

TABLE VII. — Number of species of the main taxa, associated with *C. caespitosa* colonies in the North Aegean Sea, Southern Adriatic Sea (Bari) and Ionian Sea (Taranto and Squillace Gulfs).

TABLEAU VII. — Nombre d'espèces des taxons principaux, associés aux colonies de *C. caespitosa* dans le nord de la mer Égée, le sud de l'Adriatique (Bari), et la mer Ionienne (golfes de Tarente et de Squillace).

| *Area*<br>*Depth (m)*<br>*Authors* | S. Adriatic<br>3-5<br>SCISCIOLI & NUZZACI (1970) | Ionian Sea<br>4-10<br>LUMARE (1965) | Aegean<br>3-19<br>this study |
|---|---|---|---|
| Polychaeta | 29 | 12 | 87 |
| Bivalvia | – | 5 | 16 |
| Amphipoda | – | 4 | 17 |
| Decapoda | – | 2 | 22 |
| Ophiuroidea | – | 1 | 1 |

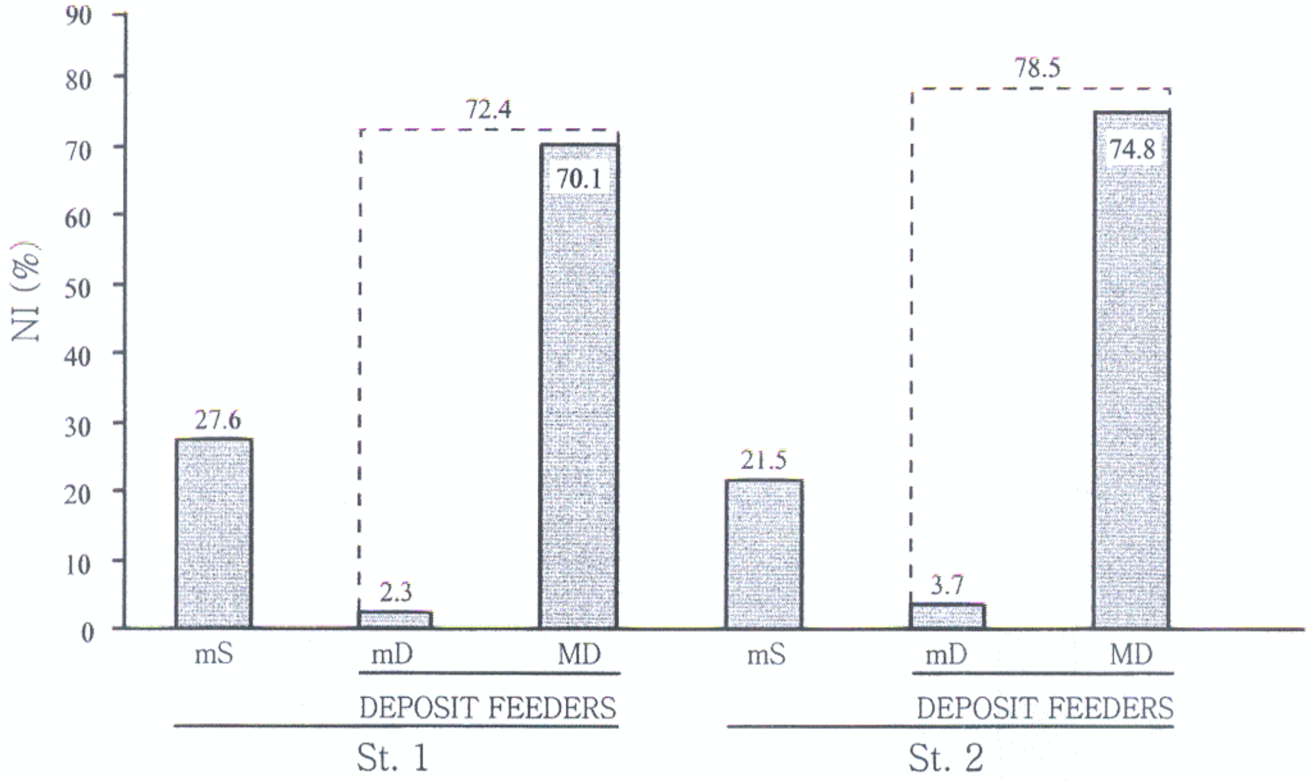


FIG. 10. — Percentages of the 3 selected feeding types concerning the total number of individuals (NI) of the dominant crustacean species in the two sites. M = macrophagous, m = microphagous, S = suspension feeders, D = deposit feeders.

FIG. 10. — Pourcentages des trois types alimentaires sélectionnés, selon le nombre total d'individus (NI) des espèces dominantes de crustacés dans les deux sites échantillonnés. M = macrophages, m = microphages, S = suspensivores, D = déposivores.

## DISCUSSION

*C. caespitosa* is the only shallow-water and zooxanthellate Mediterranean Scleractinian which, due to its shape and size, supports a diversified assemblage. Many large-sized sedentary organisms (the great majority of which are algae or sponges) were found in areas with dead corallites. The cryptofauna (vagile and sessile) has abundance, biomass and species number related to colony total volume and weight. The number of associated taxa increases with colony total volume as predicted by the island habitat hypothesis of MAC ARTHUR (1972).

Polychaetes were the dominant group, both as to number of species and individuals, followed by crustaceans and molluscs. High diversity and a similar ratio of occurring taxa was found by MCCLOSKEY (1970) for the coral *Oculina arbuscula*. In the colonies of *C. caespitosa* examined by LUMARE (1965), most of the associated species were also polychaetes, while SCHILLER (1993a) reported that the vagile cryptofauna was dominated by polychaetes, brittle stars and crustaceans.

According to the literature, all of the 212 species associated with *C. caespitosa* have also been found in other communities, mainly on hard substrate. MCCLOSKEY (1970) made the same observation for the assemblage associated with the coral *O. arbuscula*. In the tropics, however, obligatory relationships are more common and involve mainly decapod crustaceans (e.g., CASTRO, 1976; COLES, 1980).

There were significant differences between the two sites both for the number of species and individuals of the associated assemblage. These differences can be explained by the fact that, at the deeper site 2, polychaetes are more abundant than crustaceans. Molluscs are more abundant at the shallower site 1. The same difference, but less intense, appears between single samples, considered individually. There were no significant differences in biomass, and the similar means per unit volume imply that, at both sites, the available space is utilised at almost the same level.

The total number of species, mean number of species, individuals per unit volume, mean species diversity, eveness and richness, are higher at site 2. Fifty per cent of the associated species co-occur at the two sites and are represented by the more ubiquitous hard substrate species. The different participation percentages of polychaetes, crustaceans and molluscs in sites 1 and 2 are explained by the significantly different mean dominance of only a few species, namely the amphipod *Maera inaequipes*, the decapods *Athanas nitescens* and *Cestopagurus timidus*, the bivalve *Striarca lactea* and the polychaetes *Ceratonereis costae* and *Spirobranchus polytrema*. *C. costae* is one of the most common polychaetes reported on by SCISCIOLI & NUZZACI (1970), and *C. costae* and *M. inaequipes* are the most common species reported on by LUMARE (1965).

All dominant species were found at both sites, but most of them with different abundances. This may reflect more clearly the preference of the various species for some of the different conditions prevailing at each of the two sites. Moreover, the feeding types to which the dominant species belong are present in different percentages at the two sites. In all cases, suspension feeders decrease in numbers with depth, while deposit feeders increase. This difference can be attributed to the greater water movement at the shallow site 1, as it is much more exposed (longer fetch) than site 2. Moreover, the increase in depth seems to favour the microphagous deposit feeders, possibly due to a higher sedimentation. This difference in the percentage of suspension feeders and the other feeding groups was not significant. Given that both sites were adjacent to bottoms of soft substrate, this might be explained in part by the small difference in depth between the two sites and/or the existence of a tidal current at site 2, which reduces the difference in hydrodynamic intensity between the two sites. The overlap in the distribution of colony samples, concerning the percentages of the 3 feeding types of the dominant species present in each sample, seems to be mainly a result of the different distribution of the feeding types, considered individually in crustaceans, polychaetes and molluscs. Analogous overlaps were observed by GASTON (1987) and GASTON *et al.* (1988).

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