

DISTRIBUTION OF BENTHIC PHYTO- AND ZOOCÖENOSES ALONG A LIGHT GRADIENT IN A
SUPERFICIAL MARINE CAVE: DIATOMS

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On a été étudié l'influence d'un gradient de lumière sur un peuplement à Diatomées benthiques dans une grotte marine superficielle, la "Grotta del Mago", île d'Ischia (Golfe de Naples). Trois groupes d'espèces ont été évidentiés soit par l'analyse descriptive soit par l'analyse structurale. Le premier group est composée d'espèces présentes seulement dans les stations de fond; le second group, d'espèces présentes soit dans les stations de fond et dans les stations de paroi les plus extérieures; le troisième group est présent aussi dans la portion complètement obscure de la grotte.

In the framework of the research on the zonation of benthic hard-bottom communities along environmental gradients (as part of P. F. "Oceanografia" of the Italian National Research Council (CNR), the distribution of a Diatom community along a light gradient has been taken into account.

The biotope selected for this investigation is a superficial marine cave, the Grotta del Mago (Island of Ischia, Gulf of Naples), where a complete light gradient is found (Fig. 1). For the description of this biotope and sampling methods, references should be made to previous works (Cinelli *et al.*, 1977; Pansini *et al.*, in press).

According to RIEDL (1966) Diatom Microflora is very important for understanding the zonation pattern and the overall trophism in marine caves.

Thirtyeight species of Diatoms belonging to 10 Subdivisions (2 Centricae and 8 Pennatae) have been found. The maximum number of species has been recorded at the bottom-station S2B with 22 species, the minimum at the wall-stations S6 and S12 with only one species. In general, bottom-stations are richer in species than the wall-stations, these latter showing a decrease in number of species from the outer to the inner sections. Some species have also been found in stations where both transmitted light and albedo were not measurable (Fig. 2). It is interesting to note that a number of these species, which usually form colonies, have been observed only in single cells having less coloured chloroplasts. Their presence in the dark chamber of the cave may be explained by considering that many Authors have pointed out a widespread heterotrophy in Diatoms.

The structural analysis has been carried out by "Factorial Analysis of Correspondences" performed on a presence-absence table. The first two factorial axes that have been extracted explain the respective 19,82% and 15,66% of the total variance. Both are significant at $p < 0.1$.

Station-points are ordered in the factorial space as follows: S1B, S2B, S3B are isolated in the III quadrant; S1 and S2 in the IV quadrant; S3 to S12 are scattered from the I to the II quadrant (Fig. 3). As the bottom-stations and the first two wall-sta-

tions are opposed to the others in the space of FI it seems reasonable to interpret this axis as "light". The interpretation of FII is more difficult although the opposition of bottom-stations to the wall ones could lead us to identify it as "water-movement".

As far as the species are concerned, three groups can be distinguished both from the descriptive and structural analyses.

The first is composed of species which are present only in the bottom stations: Amphora sp(4), Cocconeis pseudomarginata (8), Grammatophora angulosa (13), G. oceanica (15), Lichmophora paradoxa (20), Mastogloia sp.(25), Triceratium schadboltianum (38). Some of them have been found also in the inner stations of the harbour of Ischia (Mazzella et al, 1978).

The second group contains species present both at the bottom stations and at the wall outermost ones: Biddulphia pulchella (5), B. titiana (6), Amphora bigibba (2), Grammatophora serpentina (16), Lichmophora gracilis (19), L. abbreviata (18), Navicula ramosissima (23), Synedra gaillonii (33), Triceratium repletum (37).

The species of the third group are present also in the innermost wall-stations: Amphora richardiana (3), Cocconeis scutellum (9), Grammatophora marina (14), Rhabdonema adriaticum (32). Most of the latter two groups are known to be ubiquitous.

In the factorial space the first group is concentrated in the III quadrant, the second one is scattered in the III and IV quadrant, the third group being situated in the I and II quadrant.

This ordination points out a group of species that favour calm biotopes and algal substratum in contrast to opportunist groups in terms of water-movements, some of which show a relative stenotopy as far as light is concerned.

References

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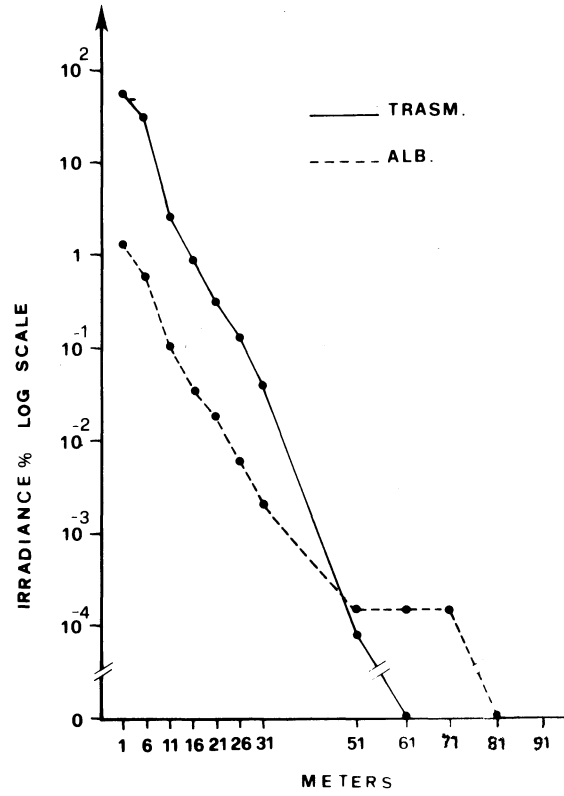
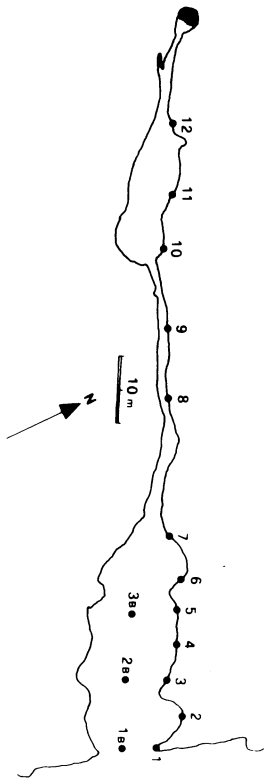


Fig.1. Map of the Grotta del Mago

Fig.2. Light gradient in the G. del Mago

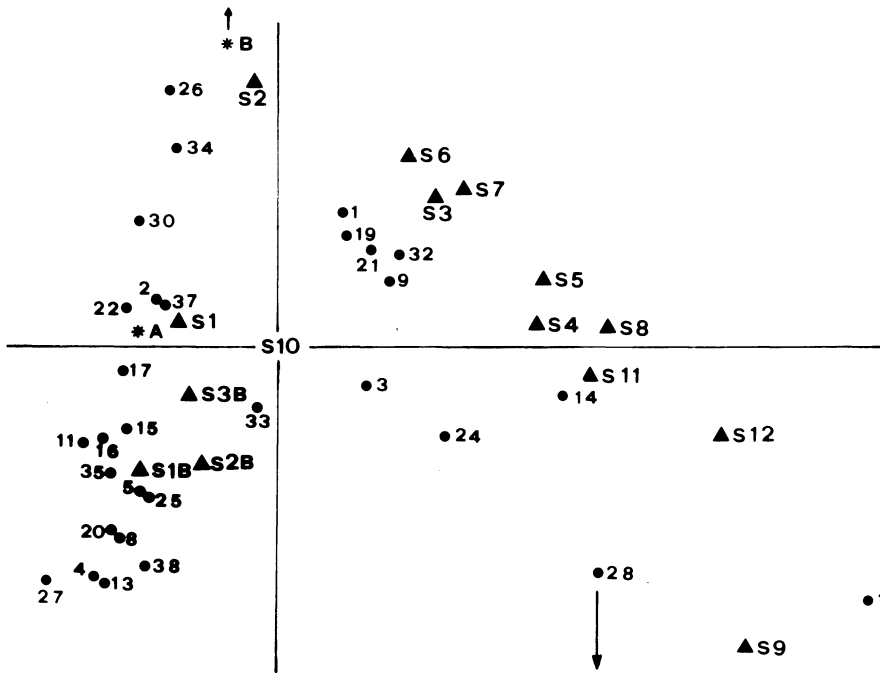


Fig.3. Ordination pattern (A and B = sites of coinciding coordinates
A = 6,18,23,31; B = 7,10,29,36)

