

A NUMERICAL ANALYSIS OF ZONATION AND FAUNAL COMPOSITION
OF THE EPIBENTHIC MACROFAUNA OFF THE
SOUTHERN MEDITERRANEAN COAST OF ISRAEL.

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Benthic macrofauna was sampled by grab, dredge and beam trawl at 11 stations along the southern Mediterranean coast of Israel. Sampling sites and species were grouped by a classification strategy consisting of the Canberra metric dissimilarity measure and group average clustering. The results were confirmed using the Czekonowski's coefficient and nearest neighbour sorting. The applicability of the "Community concepts" and zonation analysis is discussed.

The data discussed here was obtained from a survey of 3 transects perpendicular to the Israeli Mediterranean coast. 3 stations were sampled at Palmachim A (31°56'N 34°03'E) corresponding to the 35, 50 and 80 m depths; 4 stations at Palmachim B (31°55'N 34°03'E) and 4 at Nizanim (31°44'N 34°02'E) corresponding to the 20, 35, 50 and 80 m depths. Each site was sampled with Petersen bottom grab, 0.1² m, triangular dredge with arm length 0.6 m and beam trawl having an iron frame 115 cm wide. Samples were collected in January, May, July and October of 1977. During the course of the work 245 species were identified.

Sampling sites and species were grouped by classification strategies consisting of the Canberra dissimilarity measure and group average clustering (Lance and Williams, 1967) and displayed as dendrograms. The results were confirmed using the Czekanowski coefficient (Field, 1971) and nearest neighbour sorting, which revealed some relationships between samples that had been lost in the overall picture obtained by the group average sorting.

The computer classification of sites yielded results very similar to our a priori appraisal based on numerically dominant species. 4 sample groups were recognised. These consisted of samples from the shallow stations - 18 and 20 m., stations of 35 m depth, of 50 m and 80 m depth. We found that the sites were grouped on mud, muddy-sand and sandy bottom types. The species were arranged in assemblages as follows: Assemblage A - Sicyonia carinata, Philocheras monacanthus, Diogenes pugilator and Sphaeronassa mutabilis - all frequent on the shallow sandy (18, 20 m) sites. Assemblage B contained

species most frequent on the muddy sand (35 m) sites - the Indo-Pacific Stomatopod Oratosquilla massavensis and the Indo-Pacific gastropod Cerithium kochi. Assemblage C consisted of species common to all sites except the sandy ones - the crustaceans Pontocaris cataphracta, Processa nouveli nouveli (known as P. canaliculata), Charybdis longicollis and Myra fugax, the last two of Indo Pacific origin. Assemblage D was composed of species present in both the 50 and 80 m sites, such as Parapenaeus longirostris, Brissopsis lyri-fera and Dentalium dentalis. Assemblage E was composed of species present solely in the muddy (80 m) sites. These included Turritella communis, Nucula sulcata, Sternaspis scutata, Sabella pavonina and Antedon mediterranea.

Our results support the interpretation of benthic assemblages as collections of species, with each species responding to its own set of environmental determinants. Therefore "associations" are segments of near continua assemblages responding to complex environmental gradients.

The "communities" defined by the numerical analysis were compared with those suggested by others working in this area and in other parts of the Mediterranean. We concluded that there is little justification for classifying the assemblages analysed in this study as "Parallel level bottom communities" (Thorson 1957) on the global scheme, although parallel dominant or characterising species were often found elsewhere. Considered as a whole, the macrobenthic association of Palmachim-Nizanim regions of Israel have no known parallels outside the Israeli coast. This is mostly due to the absence of typical Atlantic-Mediterranean species and the presence of Indo Pacific species which had penetrated through the Suez Canal, become established and formed thriving populations, possibly dominating former Atlantic-Mediterranean communities.

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