MEGAFAUNAL ASSEMBLAGES IN THE DEEP WATERS OF THE NORTH AEGEAN SEA (HELLAS)

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Abstract

The annual summer changes of the megafaunal assemblages from 6 sampling stations in the deep waters (>500m) of north and central Aegean Sea were studied for the period 2003-2006. Geographical differentiations occur both in the composition and species diversity between stations in the north and central part of the Aegean sea. These differences are attributed to the different geographical positions and the general oceanographic and circulation features of the areas.

Keywords: Deep Waters, Aegean Sea, Biodiversity

Introduction

During the MEDITS program, annual bottom trawl surveys are conducted mainly from late spring to mid summer in the Mediterranean, in depths ranging from 10-800 m, in order to obtain estimates of abundance for a series of target species. However, little attention has been paid to the diversity and abundance of species and their relative assemblages in waters deeper than 500 m. The aim of this work is to describe aspects of the species assemblages and the biodiversity in the deep waters of the north and central Aegean Sea.

Materials and Methods

Samples from 6 stations in the depth zone of 500-800m were collected during the four years period 2003-2006 through MEDITS program. Standard net GOC 73 having a cod end mesh opening of 20mm (stretched) was used. For data analysis, the sampling year was noted as 3 for 2003, 4 for 2004, 5 for 2005 and 6 for 2006. All 6 stattions have depths between 500 and 600 m. Two of the stations (10 & 12) were located in Lemnos basin, one in Skyros basin (30), one between Skyros and Chios basins (28) and two in Chios basin (24 & 25). Catches of fish were identified to species levels for each haul. Cluster analysis was performed with PRIMER routine [1] using data transformed with Bray–Curtis similarity index. The differences between stations and the species responsible for the calculated differences were based on ANOSIM and SIMPER respectively. Biodiversity index was calculated using Shannon index.

Results

During the four years of sampling in these 6 stations, 3025 individuals were fished which belonged to 93 species. Of these 69 were fishes, 12 were cephalopods and 12 were crustaceans. Non-metric multidimensional scaling (MDS) ordination indicates that the stations were grouped based on their geographical position (Fig.1).

Statistical analysis indicated two groups that differed among them. Stations 10, 12, 28 and 30 constitute one (North) group and stations 24 and 25 the other (Central) group (ANOSIM: R global >0,75, p=0,001).

Simper analysis showed that five species are mainly responsible for the grouping of the North stations and these are *L. crocodilus, P. martia, N. sclerorhynchus, T. scabrous, A. hemigymnus, and L. dofleini* (Total contribution 72,88%).

Eleven species are responsible for the grouping of the Central group stations, *C. agassizi, C. caelorhincus, H. italicus, L. dofleini, P. longirostris, M. punctatum, H. mediterraneus, T. sagittatus, P. blennoides, P. cataphractum, N. norvegicus* (Total contribution 70,52%).

The average dissimilarity between the two groups is 78,78% with 23 species contributing 70,34% to that differentiation *C. agassizi, C. caelorhicus, T. scabrus, L. crocodilus P. martia B. glaciale H. italicus L. dofleini P. longirostris M. punctatum P. heterocarpus G. argenteus N. sclerorhynchus A. hemigymnus H. mediterraneus P. cataphractum P. sivado T. sagittatus S. veranyi P. blennoides N. norvegicus D. metopoclampus H. dactylopterus, G. melastomus.*

The Shannon Winner diversity index was calculated based on the abundance of each species for each one of the stations during the four sampling periods. Values of the index for the North group fluctuated between 1,640 and 2,839 and between 2,821 and 3,420 for the Central group during the four years of sampling. The fluctuation of the index values indicates a differentiation in the biodiversity both between the groups as well as within the groups during the years of sampling.

These differences in assemblages and diversity may be attributed to the characteristics of the deep water that has been accumulated in each of the North–Central Aegean basins and vary according to the different geographical positions of each basin with respect to the formation sites and the general circulation features of the Aegean [2]. The same authors suggest that Lemnos and Skyros basins show almost identical behaviour.

The water volume below 500 m is almost the same for these two basins, they probably share the same physical characteristics and that is why they support the same species assemblages.

On the other hand, Chios basin is by far the most prone to change. This must be attributed to its position. The major water exchange between the northern and southern parts of the Aegean take place over the Chios basin. Dense waters of high salinity and low temperature that filled the deepest parts of Chios basin, alter their characteristics through vertical diffusion as they mix with warmer and less saline intermediate waters [2].

This phenomenon over the Chios basin probably creates an environment that can favour a larger number of species with more diverse ecological attributes and that explains the higher values of Shannon diversity index. In summary, since assemblages in the north part of the Aegean Sea were always less diverse than the assemblages in the central part of the Aegean sea we assume that the composition of the communities reflect the ecological conditions at the two parts of the Aegean.

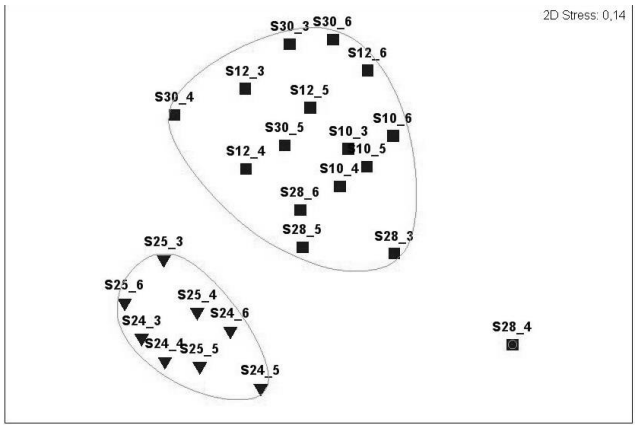

Fig. 1. MDS plot for the sampling stations for all four years of sampling based on abundance. Squares - Stations in Lemnos & Skyros basins, Triangles- Stations in the Chios Basin

References

1 - Clarke K. R. and Warwick R. M., 2001. Changes in marine communities: an approach to statistical analysis and interpretation 2nd edition. *PML*. UK.

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