MICROZOOPLANKTON IN THE SOUTH ADRIATIC SEA

Salvatore Moscatello [1], Genuario Belmonte [1]*, Letterio Guglielmo [2] and Edmond Hajderi [3]
[1] University of Salento, Lecce, Italy - genuario.belmonte@unisalento.it
[2] University of Messina, Italy
[3] University of Our Lady of Good Council, Tirana, Albania

Abstract
An oceanographic cruise has been carried out in the South Adriatic (May 2013) in the frame of the FP7 project CoCoNET for the study of connectivity among coastal MPAs. To assess the existence of pelagic propagules, an investigation of plankton composition was performed. Here the results relative to the micro-zooplankton fraction are presented. A total of 142 taxa were recognized from a total of 156 samples collected. The statistical elaboration of data allowed us to establish, for the surface samples, that the assemblages identified at least four main geographic areas. In the north, surface microzooplankton showed a similar composition between Montenegro and Apulia. In the south (Otranto channel), notwithstanding the smaller distance of the two coasts, the opposite sides remained well distinct.

Keywords: Biogeography, Mediterranean Sea, Mapping, Zooplankton

Introduction. The South Adriatic Sea is affected by two coastal currents of surface waters with different abiotic features. The southerly directed waters, along the Italian coast, show lower salinity and higher nutrient concentration [1], while the northerly ones, moving along the Balkan coast, are saltier and warmer [2]. The plankton generally show a community structure influenced by primary production which, in the Adriatic sea, typically describes East–West and South–North gradients [3]. The scant knowledge of the microplankton community, in general, encouraged to consider it in a recent study carried out for the individuation of biological possible connectivity among the two opposite coasts of the south Adriatic basin (FP7 project CoCoNET).

Material and Methods. An oceanographic cruise has been carried out in the South Adriatic sea and Otranto Channel in May 2013, to study the geographic distribution of plankton. Micro-zooplankton has been collected with Niskin bottles (each sample, 5 liters) arranged around a rosette device, at bottom and surface of 39 stations. The surface collection has been carried out between 0.5 and 1.5 m below the sea level; the bottom collection has been carried out at 3-5 m from the sea floor, in a depth range of 27 - 1170 m below the sea level. Each 5 L sample was filtered throughout a sieve of 10 µm of mesh size. At each position (bottom and surface), samples have been collected as two replicates (two different Niskin bottles) for a total of 156 samples which have been analyzed under a compound microscope. The Niskin rosette was equipped also with probes to register the main environmental parameters (Salinity, Temperature, dissolved Oxygen). A cluster analyses was carried out on abundance data of two matrices (one per each position) of 78 samples x 142 taxa to obtain a picture of the geography of the basin, based on the distribution of micro-zooplankton. A multinet BIONESS equipped, used to collect meso-zooplankton at different depths, allowed to obtain measurements of Chl *a* concentrations along the water column.

Results and Discussion. The abiotic parameters measured showed roughly constant values in the area, with exception of surface low values of temperature along the Albanian coast, with homothermy in the water column of Grama (deep > 200 m). A total of 142 taxa have been recognized in the micro-zooplankton. The whole assemblage was numerically dominated by Dinophyta, but Ciliofora showed the highest taxa richness (52 taxa). The surface stations of the geographic area clustered in four main groups (Fig.1). The bottom samples gave less understandable clusters probably because they were not homogeneous regarding to the collection depths (from 27 down to 1170 m below the sea level, according the stations). The finding of maximum Chl*a* concentration between 30 and 100 m below the sea level (according to the station) allowed us to hypothesize that a relevant part of the micro-plankton community (for example, Dinophyta, and associated organisms) could be not revealed. In fact, the maximum number of taxa found at bottom position of stations S03 and Gijri Vlore (near Tremiti islands, and in front of Vlore city, at depths < 40 m) is probably due to a collection occurred just in a layer more productive than the other analyzed (surface, and bottoms > 100 m in all the stations). The distribution of microzooplankton in surface waters of South Adriatic sea, demonstrated that marine connecting routes are not obvious. The widest part of the basin (in the North) appears as a connecting route among the two opposite coasts. The narrower part of the basin (in the South), on the contrary, is a point where the opposite coasts, although close, appear as well separated in terms of community composition (Fig. 2).

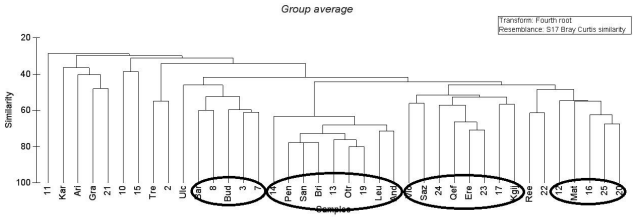

Fig. 1. Non parametric multidimensional scaling representation of microzooplankton surface samples collected in May 2013 (39 stations) with superimposed cluster at 55 % of similarity.

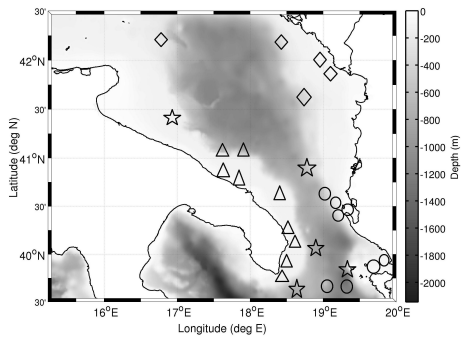

Fig. 2. Map of the clusters of stations in the south Adriatic, based on data from the surface microzooplankton. To be compared with the Fig. 1. Cluster of triangles indicates stations 13, 14, Pen, Br, 19, San, Otr, And, Leu. Cluster of circles indicates stations 17, Saz, Kgjj, Vlo, Qef, Ere, 23,24. Cluster of squares indicates stations Bar, Bud, 3, 7, 8. Cluster of stars indicates stations 12, 16, 20, 25, Mat.

References
1 - Fonda-Umani, S., 1992. Successioni fitoplanctoniche, micro e mesozoplanctoniche nell'Alto Adriatico. In: Marchetti, R., Cotta Ramusino, M. (Eds.), Atti V Congresso SITE, pp. 221–246.

2 - Zore-Armanda, M., 1968. The system of currents in the Adriatic Sea. Stud. Rev. Gen. Fish. Counc. Medit. 34, 1–48.

3 - Giordani, P., Helder, W., Koning, E., Miserocchi, S., Danovaro, R., Malaguti, A., 2002. Gradients of benthic–pelagic coupling and carbon budgets in the Adriatic and Northern Ionian Sea. J. Mar. Syst. 33–34, 365–387.