MEIOBENTHOS AND NEMATODE COMMUNITIES IN THREE ITALIAN MARINE PROTECTED AREAS (MIRAMARE, PORTO CESAREO AND CAPO CACCIA)

MEIOBENTHOS E NEMATOFAUNA IN TRE AREE MARINE PROTETTE ITALIANE (MIRAMARE, PORTO CESAREO E CAPO CACCIA)

Abstract – Meiobenthic community structure (abundance and taxa diversity) of three Italian Marine Protected Areas (Miramare, Porto Cesareo and Capo Caccia) were studied. In addition, a taxonomic, morphometric and ecological study on the nematofauna of the three MPAs, including biomass spectra, was carried out, in the attempt to show possible functional changes in the different assemblages.

Key-words: Meiobenthos, Nematoda, Marine Protected Areas, Mediterranean Sea, biomonitoring.

Introduction – The aim of the present study was to investigate the meiobenthic and nematodes community structure of Miramare, Porto Cesareo and Capo Caccia Marine Protected Area (MPA). Data gathered include meiofauna composition and taxa diversity, and nematodes taxonomy (up to genus level), morphometric (length, width and L/W ratio) and ecological (biomass spectra) parameters. The present results add further information about the structural characteristics of the meiobenthic and nematode communities along the Italian coasts (Sandulli et al., 2001, 2002; De Leonardis et al., 2006) and represent the first attempt to compare nematodes assemblages in Mediterranean MPAs through morphometric analyses.

Materials and methods – A total of 19 sediment samples were collected in triplicate during Summer 2005 in three MPAs: Miramare (Trieste), Porto Cesareo (Lecce) and Capo Caccia (Sassari), by direct hand coring in the intertidal (0-1 m depth) and in the subtidal (4-22 m depth) using SCUBA diving equipment. All samples were preserved immediately following collection (5% formalin/sea-water). After sorting, and counting of different meiofaunal taxa, a total of 100 nematodes per sample were identified to the genus level. The same individuals were measured (length and width) and a Nematode Biomass Spectra analysis (NBS) was performed (Vanaverbeke et al., 2003, 2004). Nematodes data were statistically tested via multivariate analyses (Clarke & Warwick, 1994).

Results – The sediment was mainly composed by medium or medium-fine sands (1-2.5 φ; 0.5-0.192 mm). The average meiofauna abundance recorded were 3465±333SE individuals·10 cm⁻² in Miramare (3 sites), 3492±558SE ind·10 cm⁻² in Porto Cesareo (8 sites) and 1368±222SE ind·10 cm⁻² in Capo Caccia (8 sites). Nematodes were by far the dominant taxon in all samples (69% in Miramare, 58% in Porto Cesareo and 46% in Capo Caccia), followed by Copepoda including nauplii (20% in Miramare, 28% in Porto Cesareo and 21% in Capo Caccia); the remaining taxa were present altogether with 11% in Miramare, 14% in Porto Cesareo and 33% in Capo Caccia. The average taxa diversity (H') and evenness (J) were respectively 1.24 and 0.49 in Miramare, 1.63 and 0.54 in Porto Cesareo, and 1.79 and 0.69 in Capo Caccia. A total of 28 genera of nematodes were identified in Miramare, 40 in Porto Cesareo and 48 in Capo Caccia. The dominant genera in Miramare were Marylynnia (26%, 2A), Mesacanthion (21%, 2B) and Daptonema (20%, 1B); while in Porto Cesareo Anoplostoma (36%, 1B), Dap-
tonema (11%, 1B) and Theristus (11%, 1B) were the most common; finally, Chromadorida (28%, 2A), Leptolaimus (18%, 1A) and Promonhystera (12%, 2A) were the most representative genera in Capo Caccia. One-way ANOSIM procedure on nematodes abundance (square root transformed) confirmed that there is a significant difference between the three MPAs (Global R=0.35; P=2.5%). The R values of the pairwise comparison showed very low difference in the groups Porto Cesareo-Capo Caccia (R=0.185), while Miramare MPA is distinctly different from Porto Cesareo (R=0.444) and Capo Caccia (R=0.556). The NBS (not normalised) per MPA showed a similar trend in Porto Cesareo and Capo Caccia: biomass increased with body size up to Size Class -3 and -2 respectively, and decreased again at higher size classes. Conversely, the Miramare nematodes biomass spectra peaked at size Classes -1 and 2, and higher biomass values were recorded in comparison with the other MPAs.

Conclusions - Meiofauna abundances and diversities recorded in the three MPAs are within the range of other similar Mediterranean areas. The lowest abundances and the highest diversity indices were recorded in Capo Caccia, possibly due to its oligotrophic conditions. Miramare shows the highest taxon dominance of nematodes and the lowest number of genera than the other areas, being the sediment finer and presumably richer in organic content. This also agrees with the results of NBS: Miramare nematode spectra demonstrates, in fact, the presence of larger nematodes mostly belonging to predators and omnivores, and epigrowth-feeders (i.e. Mesacanthion and Marylynnia).

The study of meiobenthic communities is, therefore, an important aid to evaluate and describe possible differences in the environmental conditions of MPAs.

References