

PRESENT STRUCTURE AND DISTRIBUTION OF MACROBENTHIC POPULATIONS IN THE NORTH - WESTERN BLACK SEA – ROMANIAN SHELF

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Abstract

The distribution of soft bottom macrobenthic populations was studied by analyzing 325 quantitative samples in the Romanian Black Sea continental shelf. A total of 240 taxa belonging to 25 systematic groups were found in the assemblages, within Polychaeta had the highest number of species and individuals. The maximum biodiversity occurred in the mud mussels and *Modiolus* biocoenosis, whereas the highest abundances in the shallow waters.

Keywords: Zoobenthos, Continental Shelf, Black Sea

Introduction

In the last decades the Black Sea has suffered major changes induced by human activities. Many species disappeared or decreased in biomass, e.g. the mussel *Lentidium mediterraneum*, *Donacilla cornea*, *Mytilus galloprovincialis* [1]. Other species increased explosively in biomass, e.g. the bivalve *Mya arenaria*, the polychaet *Melinna palmata*. It is assumed that these modifications of the ecosystem were essentially caused by changes in nutrient discharges through major rivers, particularly the Danube [1]. This study, based on the results of researches performed in the past 7 years, comes to complete some gaps in the specialty literature concerning spatial distribution of macrobenthic populations of the Romanian Black Sea Shelf.

Materials and methods

In the period 2003 - 2008, a number of 325 quantitative benthos samples were collected at depths ranging between 0 – 213 m by means of the van Veen-type grab, box corer and multicorer. The offshore samples were collected during several cruises (R/V „Akademik” 2003 and 2006, R/V „Parshin” 2005, R/V „Mare Nigrum” 2006, 2007 and 2008), while the inshore samples during several national projects covering only the sedimentary substrata. The sampling was done with 0.1 m² van Veen grab, 0.25m² box corer, 0.015 m² multicorer.

Results and Discussion

The analyses of the samples helped identify 240 taxa (235 species) of which Spongia - 9, Coelenterata - 16, Turbellaria - 3, Nemertini - 6, Polychaeta - 77, Oligochaeta - 1, Hirudinea - 1, Mollusca - 48, Bryozoa - 1, Sipunculida - 1, Phoronida - 1, Pantopoda - 2, Crustacea - 58, Echinodermata - 3, Tunicata - 6 and indeterminated taxa - 7, approximately 70% of the total number of species recorded in period 1960-1970 [2]. The mean abundance of the macrobenthic populations was 11,914.9 ind.m⁻² for density and 573.4 g.m⁻² for biomass.

Most macrobenthic taxa occurred in the samples had a small frequency; out of the 240 taxa recorded, 137 taxa had a frequency of 1-2 %, 34 taxa 2-5 %, 23 taxa 5-10 %, 27 taxa 10-20 %, 17 taxa 20-50 % and only two species had a frequency over 50 % (polychaet *Capitella capitata* and amphipod *Ampelisca sarsi*).

Numerical abundances were dominated by worms (6,974.4 ind.m⁻²) and molluscs (3,689.8 ind.m⁻²) populations representing 89 % of the total mean density of benthos. As weight, only the molluscs (*Mya arenaria*, *Mytilus galloprovincialis*) represented more than 66% of the total mean biomass.

The distribution species is conditioned by the input of fresh water from the Danube. The influence of Danube plume extend on the coast between front of Delta and Midia Cape where the number of macrobenthic species is very small, dominated by the opportunistic euryhaline species resistant in conditions of accentuated sedimentation, as: *M. arenaria*, *A. sarsi*, *Alitta succinea*.

The maximum number of species occurred at a mud mussels biocoenosis (21 – 50 m: 159 taxa) and *Modiolus* biocoenosis (51 – 110 m: 153 taxa), whereas the lowest number was found between 111 – 150 m depth (16 taxa) (Fig. 1).

The numerical and biomass abundance of macrobenthos populations diminishes from the shallow waters to the periazotic level (Fig. 2). The curves describing the distribution tendency of the density and biomass according to the bathymetric gradient is a logarithmic type function with a high correlation coefficient ($R^2 = 0.93$ for density, $R^2 = 0.85$ for biomass). The distribution of macrobenthos fauna on the Romanian shelf is limited by the drastic decrease of oxygen and the increase of H₂S at approximately 150 -170 m depth.

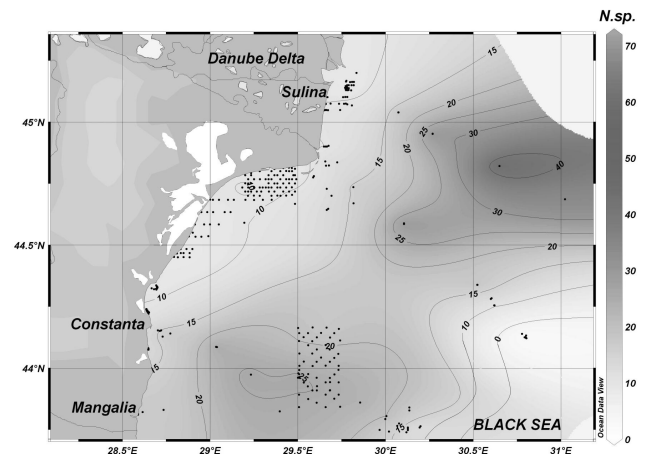


Fig. 1. The number of species of macrobenthic populations' distribution on the Romanian Black Sea Shelf

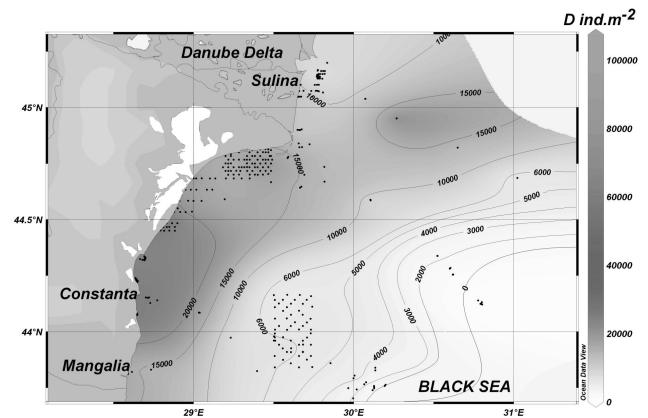


Fig. 2. The numerical abundance of macrobenthic populations' distribution on the Romanian Black Sea Shelf

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