RECENT DATA IN THE HARD BOTTOM COMMUNITIES FROM THE ROMANIAN BLACK SEA COAST

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Abstract
The authors present the qualitative and quantitative modifications of hard bottom associated fauna from the Romanian littoral, based on the analyses of 203 quantitative samples collected between 2001 - 2004. There were identified 152 taxa, with average density of 1,300,000 ind.m^{-2} and the average biomass of 17,000 g.m^{-2}. Comparing with '60-'70 period, the actual quantitative structure is five to ten times higher, while from qualitative point of view, the situation is still almost the same.
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Introduction
The hard substratum from the Romanian littoral occupies a small area of about 70 km^2. Subsequently, the coastal works and protective dikes construction led to the increasing of areas with hard substratum and expansion of artificial epibiont system even more than that of natural one. The improper analysis of hard bottoms in the past have imposed a sporadic character of the studies, the latest known studies have been made in '60-'80 period [1, 2].

Material and methods
During the period 2001 - 2004, 203 quantitative samples of fauna from hard bottom have been collected from 10 stations distributed along the Romanian littoral, by means of SCUBA and free diving. In each station were taken quantitative samples from 3 depths (0, 1, 2 m). The vertical distribution of the benthic populations was analyzed based on samples collected from 9 depth intervals (0-16m) in Agigea area. The collecting method consisted in scraping of quadrate of 400 cm^2 surface (Fig.1).
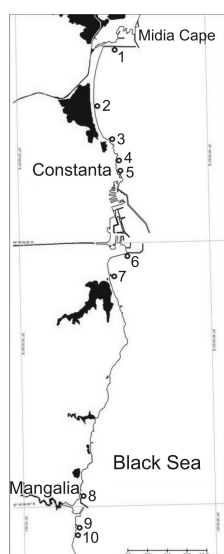

Fig. 1. Map of the investigated area with locations of sampling sites (Southern part of the Romanian Black Sea coast)

Results and discussions
The analyses of the samples helped identify 152 taxa (147 species). The polychaets (49 species) and the amphipods (21 species) were dominant in the qualitative structure with a share of 50 % of all found species. Qualitative structure of the taxonomic group is composed as follows: Porifera – 4 species, Cnidaria – 13, Turbellaria – 6, Nemertina – 4, Polychaeta – 49, Mollusca – 13, Halacaridae – 2, Bryozoa – 5, Crustacea – 50, Tunicata – 1 and non identified taxa/group - 5.
In the superior infralittoral (1 to 4m deep), 136 species were recorded, in the mediolittoral 89 taxa and 85 taxa in the infralittoral (6 to16 m deep).
Based on studies performed, it was concluded that the rock mussels' biocoenosis ranging between Cape Midia and Vama Veche, represents, in fact, a biocoenotic unity. Uniformity of structure and development are preserved in all analysed locations. The share of common species is about 85 % by abundance, due to 20 dominant species present in all locations.

According to depth the structure of rocky fauna varies significantly. The forming of associations in mediolittoral, having as dominant species the crustaceans _Hyale perieri_, _Echinogammarus olivii_, _Jaera nordmanni_, _Xestoleberis aurantia_ and _Xestoleberis decipiens_ is based on their affinity for the phytal substratum. The species grouping in the superior infralittoral based on coenotic affinities evinced the presence of an association numerically and as biomass dominated by _Melita palmata - Microdeutopus gryllotalpa - Amphitoe ramondi - Alitta succinea - Pilumnus hirtellus_. The dominant association in infralittoral is constituted within a nucleus of 4 species after density: _Melita palmata – Microdeutopus gryllotalpa - Jassa ocia - Stenothoe monoculoides_ and 10 species after biomass: _Gonothyraea loveni, Alitta succinea, Platynereis dumerilii, Cryptosula pallasiana, Balanus improvisus, Melita palmata, Microdeutopus gryllotalpa, Jassa ocia, Athanas nitescens, Pisidia longicornis_ (Bray-Curtis similarity) [3].
The trend of increase in the number of taxa with depth show biggest jump in the range 0 - 8 m of about 40 species from 0 m to 80 species at 8 m.
The average density was about 1,300 x 10^3 ind.m^{-2} and the average biomass was about 17 x 10^3 g.m^{-2}. The numerical dominants are represented by worms (580,000 ind.m^{-2}) and crustaceans (650,000 ind.m^{-2}) and as weight by molluscs (19,500 g.m^{-2}), crustaceans (215 g.m^{-2}) and worms (35 g.m^{-2}). Meiobental segment represents 87 % of the total average density while the biomass of macrobental forms over 99 %.
Relationship between numerical abundance and maximum weight of benthic fauna on natural hard bottoms and artificial hard bottom is 1 : 3 for density and 1 : 3.6 for average biomass.
Number of crustaceans species reported amounts to 50 (except the copepods) value that is superior to those cited in 1975 - 1995 period [2]. The current qualitative structure could be compared with that described for the Agigea rocky associations in 1961 [1].
The abundances are at least 5 to 10 times higher compared to those of '60s - '70s. The average density of 280 x 10^3 ind.m^{-2} from Agigea in `70 years have been much lower than in 2003 - 2004 period which was 1,300 x 10$^3$ ind.m$^{-2}$. Comparative analysis shows a profound destabilization of the population equilibrium, characterized by domination of worms by late of `80s (72 %) at the expense of other groups (Crustacea 17 %). The current state of benthos associated with hard substrate falls within the normal evolution (e.g. 38 % worms, Crustacea 54 %) compared with that of '60 period [1].
Taxa whose actual number reported in very low or none in previous years and which now form well contoured populations at Romanian seaside are _Opercularella lacerata_ (F-25 %), _Ventromma halecioides_ (F-30 %), _Tergipes tergipes_ (F-50 %), _Ericthonius difformis_ (F-40 %), _Jassa ocia_ (F-50 %), _Siriella jaltensis_ (F-20 %), _Athanas nitescens_ (F-60 %), _Eriphia verrucosa_, _Palaemon adspersus_ (F-20 %), _Pisidia longicornis_ (F-70 %). Rare species with single occurrence cited as missing in recent years are _Limapontia capitata_, _Cymadusa crassicornis_, _Brachynotus sexdentatus_.

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