

BIODIVERSITY OF "COCKETRICE" SANDY BANK (BLACK SEA) - A PREREQUISITE FOR ITS CONSERVATION AS A PROTECTED AREA

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Considering the growing in the last years interest shown by various economic organizations to take sand from the Black sea natural deposits for construction purposes, as well as the negative effect registered after such activity along the coast of Ukraine (Odessa), detailed oceanological investigations -including direct observation of the

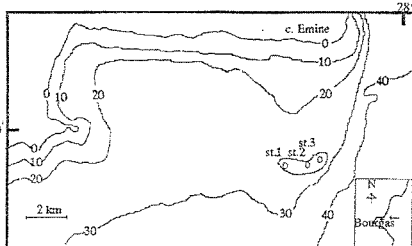


Figure 1 : sampling stations

“Cocketrice” sandy bank - have been carried out during 1986-89 period (DIMITROV *et al.*, 1990). This bank, discovered by the English oceanographic vessel “Cocketrice” in 1887, is located in the North-Eastern part of the Bourgas Bay - the greatest and most polluted bay along the Bulgarian Black sea coast (Fig. 1). According to the main results obtained, the highest part of the bank is 16.2 m deep, the sand is of a mean grain size composition and the potential sand stock amounts to about 126 mln.t. The unusual location of the cresting bank with hardened sections in some high disposed zones and relatively strong streams in its eastern part predispose favourable conditions for the development of the typical for the rocky sublittoral *Mytilus galloprovincialis* population. These data gave grounds for conclusions that the specifying of the biota status in this reef-like structure is of a special interest having in mind that it is located in the most ecologically threatened zone along the Bulgarian Black sea coast and the need to estimate the ecological effect after a possible sand exploitation is obligated. Moreover, the results obtained would be a definite contribution at present when there is a pronounced tendency to use artificial reefs along the Bulgarian sector of the Black sea for restoration of the destructed coastal ecosystems.

Sampling from three stations (at 18, 21 and 22 m depth) by Van-Veen grab, covering 0.1m² has been carried out seasonally during 1991-92. The samples were washed through a set of sieves (the last one with 0.6 mm mesh size) and fixed in 4% formaldehyde. All macrozoobenthic specimens were defined to species level (excluding *Nemertini*, *Turbellaria* and *Oligochaeta*), counted and weighed. The Sorensen's coefficient of similarity and Shannon Weaver H-index were calculated; the species abundance/biomass comparison method was used for detecting pollution effect (WARWICK, 1986). A total of 92 macrozoobenthic species and groups are registered in all stations (st.1-18 m; st.2-21 m; st.3-22 m depth), the most numerous of which are *Polychaeta* (34), followed by *Crustacea* (29) and *Mollusca* (22). According to Sorensen's coefficient (48.2) the most shallow zoocoenosis (st.1) strongly dominated by *Mytilus galloprovincialis* is differentiated as a specific one, that necessitates a separate discussion of the results. The species composition in this station consists of a total of 65 species and groups (including *Pisces* larvae) among which prevails *Polychaeta* (25), while *Crustacea* and *Mollusca* are presented by 20 and 16 species respectively. The number of species varies slightly seasonally from 35 during the summer to 39 during the winter. In the total abundance (14492 ind/m²) *Mollusca* predominates (60.6%) presented mainly by *M. galloprovincialis* (48.4%) together with sparsely distributed *Chamelea gallina* (8.3%). The seasonal maximum in abundance is in summer (20925 ind/m²), *Crustacea* showing the most intensive (3.2 times) increase. The total biomass (4045.0 g/m²) is structured mainly by *Mollusca* (99.4%) the two basic species *M. galloprovincialis* and *Ch. gallina* presented by 57.7% and 38.0% respectively. The average H-index value (2.93) varies slightly seasonally : from 2.7 during the summer to 3.3 during the spring. The results show that a specific zoocoenosis has been formed in this highest zone of the sandy bank : it combines the characteristic features of the two richest zoocoenosis - the *Mytilus* rocky and sandy ones. The registered *Pisces* larvae (20 ind/m²) testify to the existence of favourable conditions for ichthyofauna reproduction and development.

The high degree of similarity between macrozoobenthic communities in st.2 and 3 (75.2) gave ground to analyze their data unified. The species composition in this part of the sandy bank is more various; from the total of 80 species and groups, 30 are *Polychaeta*, 25 *Crustacea* and 19 *Mollusca*. The species diversity increases from 42 species registered in spring to 60 in the summer, from which *Polychaeta* and *Crustacea* are almost equally presented (20 and 19 species respectively). In the total abundance (13149 ind/m²), *Polychaeta* prevails throughout the year (63.5%) while the rest of the quantity consists of *Crustacea* (16.6%) and *Mollusca* (17.2%), a structure typical for sandy zoocoenosis. The maximum abundance is registered during the summer (24537 ind/m²) which is due to a certain degree to the *Pisces* larvae high quantity (7090 ind/m²). The summer is the season with the highest H-index value also : 3.74 (average H = 3.48). In the total biomass (1730.0 g/m²) prevails *Mollusca* (88.96%) with the typical sandy species *Ch. gallina* predominance (61.36%). A comparative analysis with the Bourgas Bay zoobenthic communities status shows that : 1/ the species diversity is considerably lower (54 species); 2/ a tendency for maximum abundance drop is registered during the crucial summer period (39 times *Crustacea* density reduction); 3/ the average density and biomass are almost 10 times lower; 4/ the communities are characterized as “grossly” and “moderately polluted”; 5/ *M. galloprovincialis* population dies during the summer as a result of the deteriorated environmental conditions (hypoxia), that prevent the population from reproduction in the Bay (STOYKOV *et al.*, 1994).

Consequently, the “Cocketrice” sandy bank is a nature reserve inhabited by unique zoobenthic coenoses differentiated from the adjacent region by the following peculiarities : 1/ high biodiversity and sustainable abundance and biomass structure, that determine their ecological status as “unpolluted” throughout the year; 2/ the presence of a normally functioning *M. galloprovincialis* population which as the most powerful biofilter among the Black sea *Mollusca* contributes to the de-eutrophication of the area; 3/ the presence of some threatened by extinction *Crustacea* (*Upogebia pusilla*); 4/ *Pisces* larvae great quantity presence defines this bank as a spawning area. All these prerequisites determine the imperative need for preventing the “Cocketrice” sandy bank as a protected area.

REFERENCES

- DIMITROV, P., E. DEMIREV, J. CHERNEVA, D. SOLAKOV. 1990. Rep. Int. Symp. Geol. monit. geocol. probl. Baltick and Black sea, Petersburg, Russia.
STOYKOV, S. *et al.*, 1994. *Proc. Inst. Fish.*, Varna, 22 : 5-57.
WARWICK, K.M. 1986. *Mar. Biol.*, 92 : 557 - 562.