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THE ANALYSIS OF LONG-TERM CHANGES IN THE STRUCTURE AND DIVERSITY OF PELOPHYLIC COMMUNITIES IN THE KARKINITSKY GULF

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The Karkinitsky Gulf is known for the highest production in the Black Sea. Our study focused on the central deep-water part of the gulf. Deep-water benthos is characterized by steady structure of the undisturbed community. As soon as the biotope undergoes changes, the structure of bottom-dwelling population also changes. The description of benthos structure has highlighted the transformations which took place in the structure of benthic community during the past 50 years.

During the 1930s the community of *Abra nitida* inhabited the central part of the gulf (Lebedev, 1936). In the 1980s it had moved northwest and was replaced by the community of *Nephtys hombergii* (Povchun, 1986, 1990).

Distribution of the density of benthic organisms was examined using log-normal model of species abundance distribution (Preston 1948, 1962). The analysis has shown that in the 1930s the numbers in the community of *Abra nitida* conformed to log-normal model for ecological equilibrium. During the 1980s the numbers distribution in the community of *Abra nitida* changed towards a transitional state and in the community of *Nephtys hombergii* towards structure simplification. During the 1930s the structure of *Abra nitida* community generally corresponded to that Preston described for ecological equilibrium except for the portion of rare species that had been slightly greater and the portion of dominant species that had been slightly lesser; during the 1980s the fraction of dominant species reduced and a number of rare species vanished. In the community of *Nephtys hombergii* the portion of rare species had been high while that of characteristic species low. Average abundance and biomass measured in the *Abra* community decreased two-fold. During the 1980s the most pronounced changes in population density were observed in species, the numbers of which had been in the range from 8 to 63 individuals (Pearson, 1983). For example, the polychaete *Nephtys hombergii* decreased in the numbers while *Terebellides stroemi* increased, the bivalve molluscs *Parvicardium exiguum* and *Abra renieri* increased in the abundance and *Pitar rudis* decreased, the ascidian *Eugira adriatica* also grew more abundant.

In comparing between hypothetical species diversities rarefaction method was used (Sanders, 1948). The hypothetical curves show that highest diversity is characteristic of the communities of *Abra nitida* in the 1930s and of *Nephtys hombergii* in the 1980s. Results obtained by means of rarefaction method conform to those obtained using index analysis of density and biomass factual values. The analysis of Shennon indices for the numbers and biomass and Simpson index for the diversity proves the diversity pattern derived from the hypothetical curves.

On the k-dominance curve the community of *Abra nitida* has largest evenness in the 1930s and high dominance in the 1980s as the values of Berger-Parker and Simpson indices demonstrate.

Assessed by means of Chekanovsky-Serensen index, the faunistic similarity in the *Abra* comminity of the 1930s and the 1980s is 0.60, while that in the *Nephtys* and *Abra* communities in the 1980s is 0.70, differing only in the quantitative development of species.

The k-dominance curves representing biomass to numbers ratio point out that in the 1930s K-strategists were absent in the community of *Abra nitida*. The diversity of biomass prevailed over the abundance, r-strategists contributed the major share to the abundance. Probably, greater diversity of biomass is characteristic of pelophylic community that has reached ecological equilibrium. The curves, which describe the Abra community of the 1980s, indicate moderate pollution level and those representing *Nephtys* community – grave pollution (Warwick, 1986).

Studying local species successions of the deep-water benthos in the Karkinitsky Gulf yields some regularities and patterns of changes in the structure even in the absence of data on background parameters of the environment.