

## RELATIONSHIP BETWEEN SEA ENVIRONMENT CONTAMINATION AND VIRUS-TO-BACTERIUM RATIO IN SEDIMENTS

OLGA A.STEPANOVA

Institute of biology of the Southern Seas by A.O.Kovalevsky of National Academy of Sciences of Ukraine, Avenue Nahimov 2, Sevastopol 99011, Ukraine

Marine microorganisms, bacteria and viruses, are sensitive biological association to any ecological disbalance. Microorganisms from benthos are more stable then these from plankton, and their quantity and morphological biodiversity reflect health ecosystem of the sea environment.

We studied qualitative and quantitative characteristics of the bacteria and viruses, represented in benthos of clean open and polluted coastal waters of the Black Sea near the Sevastopol city. Marine sediments were taken from fifty different stations of Sevastopol bays and open sea during summer 1997 and 2000. We also collected samples from 13 stations in aquatic-coastal Crimea Peninsula in spring 1999.

The number of bacterium in sediments changed from  $1 \cdot 10^5$  to  $1.4 \cdot 10^7$  cells per 1 gr. and number of viruses changed from  $7 \cdot 10^3$  to  $4.8 \cdot 10^6$  forms per 1 gr. Amount of bacterium in Crimea coast area sediments varied from  $1 \cdot 10^6$  to  $1.4 \cdot 10^6$  cells in 1 gr. and viruses - from  $3 \cdot 10^5$  to  $7 \cdot 10^6$  in 1 gr. Bacterium quantity grows to maximums ( $2 \cdot 10^6$ - $1.4 \cdot 10^7$  cells in 1 gr.) and viruses fell down to minimums ( $7 \cdot 10^3$ - $1.3 \cdot 10^4$  forms in 1 gr.) in microbial community in sediments of polluted Sevastopol bays, and inside out, a number of viruses increased ( $3 \cdot 10^5$ - $7 \cdot 10^6$  forms in 1 gr.), and bacterium fell down ( $1 \cdot 10^5$ - $3 \cdot 10^5$  cells in 1 gr.) in nonpolluted coastal area and in the open sea. Virus-to-bacterium ratio in sediments of Sevastopol bays varied from 0,0012 to 7,4, rising in Crimea coastal areas to 0,2-7 and in the open sea to 1-20. So the most low significances were observed in ecologically unfavourable Sevastopol bays, and high in nonpolluted aquatoriums, in littoral part of Crimea and in open sea. Such distribution of virus-to-bacterium ratio probably related to their roles in ecology of marine environment: responsibility of bacterium by destruction of pollutants and viruses - by virus-mediated mortality of bacterial host cells.

Most of the marine bacteria where presented in three forms: spindle, oval and round. The spindle forms are dominated in ecologically unfavourable coastal waters. Oval and round shaped forms mostly presented in nonpolluted sea environment. Marine viruses also where divided in several morphological forms: spindle, lemon-shaped and round forms have been found as a main fraction among marine viruses, sometimes - filament viruses. In sediments collected from unfavourable Sevastopol bays in generally there were founded spindle-shaped forms. A most forms variety of marine viruses were observed in healthy sea environment.

Exposed relation between contamination of sea environment and virus-to-bacteria ratio in marine sediments can be used as index of ecological healthy of sea environment.