

GENERATION TIME OF HETEROTROPHIC BACTERIA IN THE MIDDLE ADRIATIC

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Dans le travail sont discutés les résultats de recherches pluriannuelles sur la reproduction des bactéries hétérotrophiques.

Monthly samplings of heterotrophic bacteria for their distribution and rate of reproduction studies were carried out at the Kaštela Bay-Stončica cross-section in 1968-1978.

Heterotrophic bacteria were examined at ZoBell 2216 medium, and generation time determined by the Ivanov's method (1955).

Observations of annual mean densities of heterotrophic bacteria show year-to-year variations in their density and their higher densities in the coastal area Kaštela Bay (Table 1) owing to the larger quantities of the organic matter found there.

Table 1. Annual means of heterotrophic bacteria

Year	1968	1969	1970	1971	1972	1973	1974	1976	1977	1978
K.B.	771.1	447.3	208.1	300.7	445.8	390.2	295.9	309.6	541.9	542.9
St.	157.1	265.6	64.2	143.6	78.1	69.4	21.6	99.6	90.8	148.6

Generation time varied from 0.6-145 hours (485 analysed samples) at Stončica and from 0.6-180 hours (297 analysed samples) in the Kaštela Bay. From monthly means it appears that rate of bacterial reproduction at Stončica mainly exceeded that in the Kaštela Bay. At first sight, this disagrees with the larger number of chemoorganotrophs in the coastal area. However, bacterial quantities in an area are not determined only by their reproduction rate, but as well by a more or less intensive elimination due to unfavourable conditions. Namely, the factor of correlation between hete-

rotroph numbers and their generation time is 0.25 in the Kaštela Bay and 0.30 at Stončica. This indicates that reproduction rate is not the only factor affecting heterotrophic bacteria density.

The Kaštela Bay is a coastal area significantly affected by pollution which is assumed to be one of the factors affecting lower rate of bacterial reproduction.

Subsequently, considerable differences in the reproduction of bacteria between different sea layers were observed. In analysing all the means by layers it was observed that in the Kaštela Bay bacterial reproduction rate was highest in the intermediate layers (10 and 20 m) and lowest in the surface layer. Similar was observed in the open sea, as well. This may somehow be related to phytoplankton quantity in the surface area and to the UV radiation.

It should be mentioned that negative generation time was recorded for 19% Stončica samples and for 18% Kaštela Bay samples. This means that elimination rate exceeded the reproduction one. However, this was recorded exclusively from some of the sampling layers, and above or below them reproduction time took very little time.

To explain better the above phenomena, the dependence between heterotrophic bacteria and basic abiotic factors, temperature and salinity, was also observed. Correlation factor was -0.18 with temperature and -0.20 with salinity in the Kaštela Bay. At Stončica, however, where considerably larger series of factors were included, correlation factor was -0.14 with temperature and -0.03 with salinity. Thus, higher temperature and salinity affect bacterial reproduction accelerating it, but not as much as we expected. However, it should be emphasized that further studies should give more attention to the planktonic communities which may affect the development of bacterial population more significantly than abiotic factors.

Bibliography

Ivanov, M.V. 1955. Metod opredelenia produkcii bakterial'noi biomassi v vodocane. *Mikrobiologia* 24 (1): 79-89.