

DIURNAL PLANKTON INVESTIGATION IN AN EXPERIMENTAL AREA, IN THE REACH OF THE KISKÖRE RIVER BARRAGE

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(Received 30 June, 1975)

Abstract

The total bacterial number showed no significant change during the investigation. The algological investigations demonstrated a eutrophic phytoplankton of stable species and individual count where the change was indicated by the migration of flagellatae and the progressive increase in the individual number of Chlorophyceae. The vertical migration of the Rotatoria resp. Crustacea plankton is considerable, as well.

Introduction

The diurnal investigations give information on the biological and chemical rhythm, dynamism of some water area. Conclusion may be drawn concerning the stability of the ecosystem, the trend of its development. Connecting the modification of stratification with vertical measurements, we can recognize the degree of the vertical migration. At investigating unstable systems, it is particularly important to study the oxygen — carbon dioxide circulation and the factors influencing it in a direct way. In the area beside the Kisköre River Barrage we have investigated the effect exerted by the inundated woody part on the quality of water (B. TÓTH 1975, BANCSEI 1975, HAMAR 1975). In the course of our diurnal investigations, we have also studied the dynamism of the chemical parameters (BANCSEI and KATONA 1975).

Method

The total bacterial number was determined with a membrane-filter technique (FELFÖLDY 1974). The *Planctomyces bekefii* GIM. number and the algological investigations were carried out with Utermöhl's technique, the quantity of zooplankton was determined in a counting chamber. Surface samples were taken in every three hours, on September 17th, 1974 between 0—24 o'clock, from the open-water parts of the experimental area, at a sampling point. The results of chlorophyll content were placed at our disposal by MÁRIA B. TÓTH. We should like to record our gratitude for her kindness.

Results

The total bacterial number was changing between 13.9—15.3 million ind./ml, showing no evaluative dynamism. The individual count of *Planctomyces bekefii* GIM. is changing but the changes are not significant (Tab. 1).

The qualitative composition of algae is as follows:

| | |
|-------------------|----|
| Cyanophyta | 5 |
| Euglenophyta | 10 |
| Pyrrophyta | 7 |
| Chrysophyceae | 8 |
| Bacillariophyceae | 11 |
| Xantophyceae | 1 |
| Chlorophyta | 47 |
| Sum total | 89 |

The difference from the average species number is but a minimum.

It appears from the quantitative analyses that the dominance and abundance values give a similar result (Fig. 1).

From among the species of the two dominant groups Chlorophyta and Chrysophyceae, the individual count of *Ankistrodesmus falcatus* and other cosmopolitan species, as well as that of *Chrysococcus biporus* is high. More than 30 per cent of the species, and among them the dominant species, occur in every sample. The total algal count and dominance of the stand of high individual count are comparatively stable,

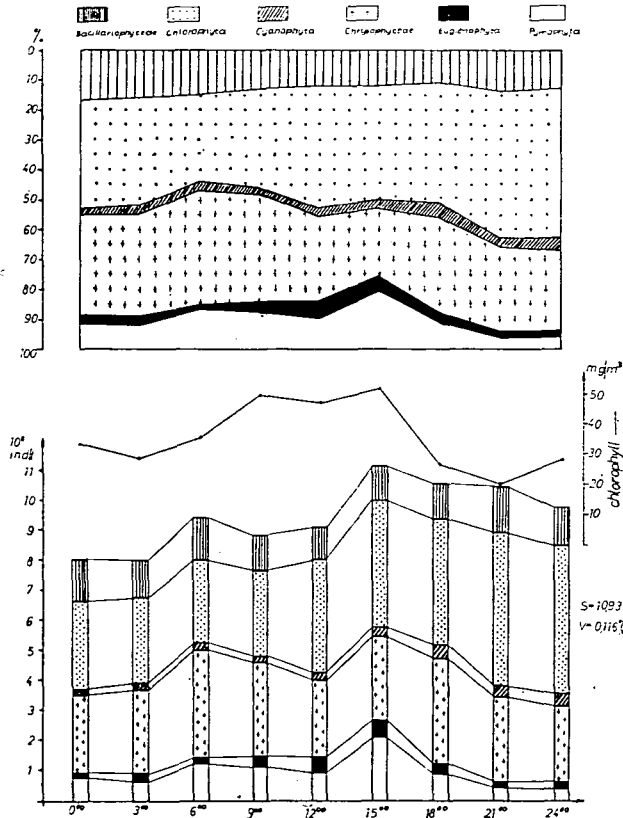


Fig. 1. Dynamism of the individual number and percentage distribution of phytoplankton. Change in the chlorophyll content.

the relative dispersion (v) being 0.116 per cent, $S=10.93$. A change can be observed in the day-time hours concerning the increase in the individual count of the species Euglenophyta and Pyrrophyta that are capable of changing their place actively (Tab. 1). The increase reaches maxima in the early afternoon. The samples were taken in a sunny weather. The positive phototaxis of some flagellatae may be supposed. In the vertical migration of small waters, as well, flagellatae do play a part (Iyengar 1933, Philipose 1959). The gradual increase of Chlorophyceae is equally shown by both the dominance and abundance values (Fig. 1). The fortnightly systematic investigations (HAMAR 1975) did indeed show in that period an increase in stand.

The chlorophyll content changed between 20—50 mg/cc.m. A rise could be observed in the day-time hours. But there is no correlation between the total algal count and chlorophyll content.

Their number is higher in the night hours, in the afternoon it is lower in the surface-water layer.

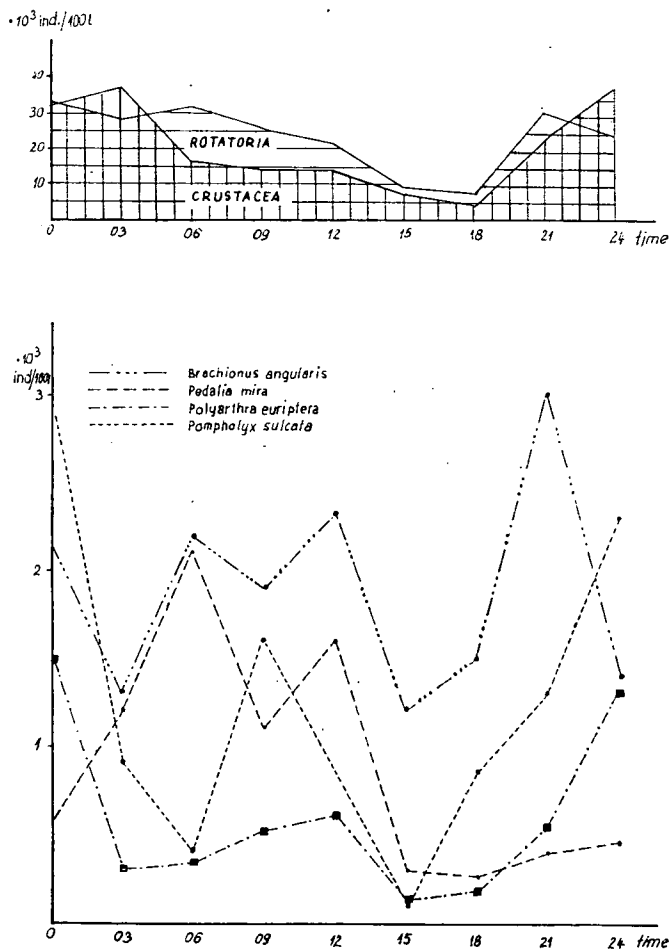


Fig. 2. Quantitative dynamism of the Rotatoria and Crustacea plankton. Migration of some Rotatoria species according to the hour of the day.

In the samples dipped out of the water surface given, the species- and individual-counts of zooplankton were considerably different from each other in the various hours of the day (HYMEN, L. H. 1951, BAYLOR, E. R.—SMITH, F. E. 1957, ARORA, H. C. 1965, GEORGE, M. G.—FERNANDO, C. H. 1969, KUTIKOVA, L. A. 1970). The study of zooplankton in this way is made more difficult by that these organisms can wander not only vertically but horizontally, as well. In order to evaluate correctly the zooplankton stand of a water surface, possibly on the basis of point-samples, too, we had to deal with the subject of the wandering according to the parts of the day under the conditions in this country.

Evaluating the results of the investigations of the Rotatoria and Crustacea plankton in the surface samples dipped between 0 and 24 o'clock on September 17th, 1974, we observed in case of several species some changes in the individual count from which their vertical wandering could be concluded (Fig. 2).

The Rotatoria-plankton was the least dens between 15—18 o'clock while at night their count was considerably larger. We have observed a more or less regular rhythm in case of species *Brachionus angularis*, *Pedalia mira*, *Polyarthra euriptera*, *Pompholyx sulcata* (Fig. 2).

The Crustacea number in Case of Rotatoria took shape in a similar way as observed: at night their count is higher, in the day it is lower in the surface-water layer. From among the *Cladocera* species, only *Bosmina longirostris* was found in all the samples. The species *Ceriodaphnia megops*, *Moina rectirostris* were only found in the night hours.

The single *Cyclopoida* species, found on the occasion of the investigation, showed the maximum individual count similarly in the night hours.

On the basis of the results of the 24-hour zooplankton investigation it seems so that the migration of the species Rotatoria and Crustacea according to the hour of the day is fundamentally influenced by (the strength and possibly the angle of incidence of the) light. The Rotatoria and Crustacea number may reach in the night hours even the treble of the values experienced in the afternoon hours. At the majority of the species found we have observed a negative phototaxis. In case of surveying, thorough-going investigations (at ethological and phenological estimations) the hours of the day of the immigration of species, and therefore the numerical differences resulting from the immigration, must needs be taken into consideration, as well.

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