SEASONAL DISTRIBUTION OF THE CILIATED PROTOZOA AND MICROMETAZOA IN THE NERETVA CHANNEL (SOUTH ADRIATIC)

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Abstract:
Annual distribution of the microzooplankton density was investigated in Neretva Channel from November 1998 to October 1999.

Keywords: zooplankton, Adriatic Sea

Introduction:

Preliminary investigations of microzooplankton in Mali Ston Bay during the 1973 showed that the smallest zooplankton organisms are of importance in the Adriatic Sea [1]. During the next decade, the investigations became more intensive in the inner part of the Bay and tintinnines became one of the most studied microzooplankton groups [2]. Species composition, density and vertical distribution of tintinnines were observed. However, the data of seasonal distribution of nonloricates, nauplii, copepodites, adult small copepods and other micrometazoans are scarce and refer to research carried out during the 1979/80 [3].

Material and methods

Microzooplankton was studied at station in the Neretva Channel (43° 1.5' N and 17° 24.8' E) between November 1998 and October 1999 (Figure 1). Samples were taken at 0, 5, 10 and 18 m depth using Niskin bottles (5 l volume). The material was preserved in 2.5% neutralised formaldehyde. In the laboratory the volume of samples were reduced to a few millilitres after 72 hours by using the sedimentation and decantation methods [1]. The organisms were counted using the inverted microscope "Olympus" IMT-2, under 100x magnification.

Seawater temperature and salinity were measured with IDRONAUT 316 CTD Multi-parameter Probe.

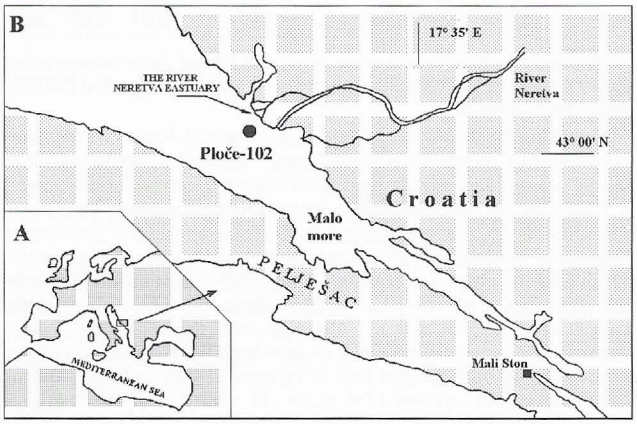

Figure 1. Study area (Neretva Channel) with the sampling station - Ploce-102

Results and discussion

Seasonal distribution of nonloricates was distinguished by two peaks, the first in the autumn-winter period and the second in the spring with the mean values higher then 200 ind.l^{-1}. The maximum, 496 ind.l^{-1} was obtained in May at the surface when were recorded the intensive inflow of fresh water (Figure 2). Throughout the year, 63% of nonloricates were in the upper 5 m from the surface. They accounted an average of 83% of the total ciliated protozoan density.

Tintinnines were more abundant only in November with the mean density of 66±15 ind.l-1 and were represented with 21% of total ciliated protozoans. Until spring organisms were retained in deeper layers. From May on tintinnines come closer the surface and the maximum of 84 ind.l-1 in August was found at the surface. At the investigated station a total of 33 tintinnine species were found. Qualitatively the most important ones were Salpingella rotundata and Stenosemella nivalis which account 41% of tintinnine count. The first one prevailed in the plankton during the summer-autumn period and the second one during the autumn-winter period. That seasonal pattern of ciliated distribution is comparable to investigations in other temperate waters [4, 5]. Their distribution could be influenced by abiotic factors and metazoan grazing what confirm the significant correlations between nonloricates and salinity, and tintinnines and micrometazoans.

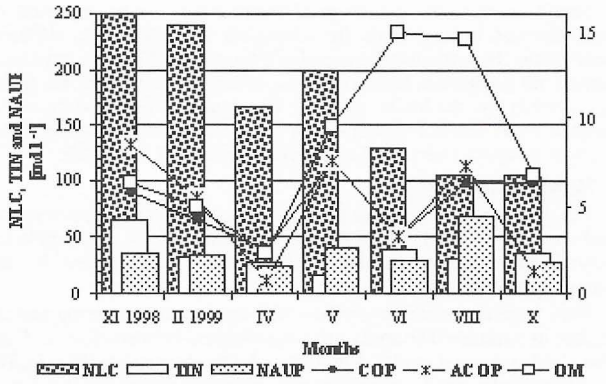

Figure 2. Seasonal fluctuations in the abundance of nonloricates (NLC), tintinines (TIN), copepod nauplii (NAUP), copepodites (COP), adult small copepods (ACOP) and other micrometazoans (OM)

Copepod nauplii were qualitatively the most important micrometazoans especially in August with the average density of 68±50 ind.l^{-1} and the share in total micrometazoans of 71% (Figure 2). During the summer stratification of the water column, nauplii retained in the surface layers, with the highest density (132 ind.l^{-1}) at the surface.

Copepodites and adult small copepods were of less importance at this station and their shares in total of micrometazoans were the highest in October of 14% and 16%, respectively. Other micrometazoans comprise of following groups: Cladocera, Pteropoda, the small larvae of benthos organisms and planktonic tunicata. They contribute to the total of micrometazoans the most in June (29%).

The smalest average densities of microzooplankton related to number in other Adriatic bays [6, 7] point at their limited role as a conduit for carbon flow to higher trophic level.

This paper gives some new data about the microzooplankton distribution and contribute to the knowledge of their ecology in coastal waters.

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