

# PHYTOPLANKTON ASSEMBLAGES AND DENSITY IN THE MONTENEGRIN COASTAL SEA

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## Abstract

The Montenegrin coast is influenced by extensive use of the littoral zone and increasing development of tourism. All these changes cause increased eutrophication. We studied microphytoplankton assemblages from April to September 2009 in Boka Kotorska Bay and the Montenegrin coast. The highest values of microphytoplankton density and some species indicators of eutrophication were found in the inner part of Boka Kotorska Bay.

**Keywords:** Coastal Waters, Plankton, Adriatic Sea, Eutrophication

## Introduction

Boka Kotorska Bay is a part of the Montenegrin coast, located in the southeastern part of the Adriatic Sea. Due to its structure, values of some parameters indicators of eutrophication level are high enough to classify the region as eutrophic.

Materials for investigation were collected from April to September 2009 in monthly intervals at 15 stations in the inner part (Kotor Bay and Risan Bay), middle part (Tivat Bay), outer part (Herceg Novi Bay) of Boka Kotorska Bay and outside the Bay, in the open sea (Fig.1). Samples were taken using 5l Niskin bottles on three depths (surface, middle and bottom). Microplankton abundance was determined using a Leica inverted microscope [1]. Chlorophyll *a* concentration was determined by measurement of absorbance with a Perkin-Elmer spectrophotometer and calculation according to Jeffrey et al. [2].

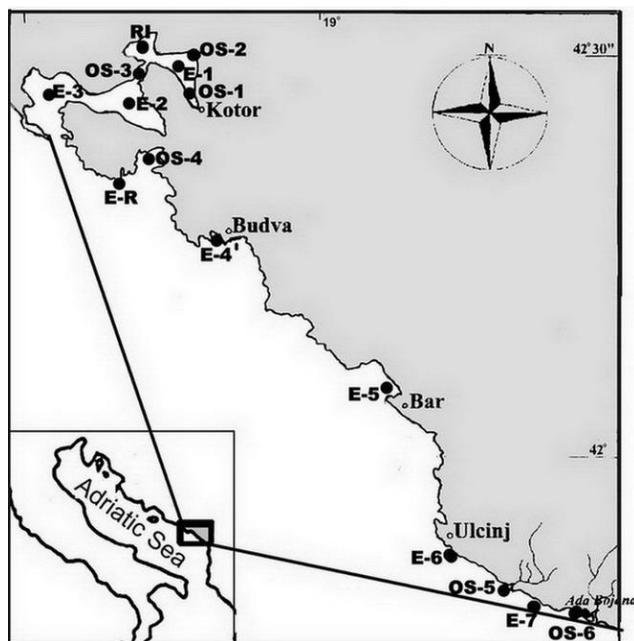


Fig. 1. Investigated area

## Results

Oxygen saturation was positively correlated with microplankton abundances. Maximum values (from 115.7% to 125%) were found in July. The largest mean value of microplankton abundance was found in July ( $8.40 \times 10^5$  cells L<sup>-1</sup>). Also in July we noticed two more peaks ( $3.86 \times 10^5$  and  $3.08 \times 10^5$  cells L<sup>-1</sup>). The fourth peak occurred in August ( $3.05 \times 10^5$  cells L<sup>-1</sup>). All peaks were found in the summer period in the inner part of Boka Kotorska Bay. Outside the Bay values were lower, with maximum abundance of  $7.84 \times 10^4$  cells L<sup>-1</sup> in the mouth of Bojana river. On the surface layer maximum microplankton abundances were on the order of  $10^6$ , as it is present in the other eutrophic region [3].

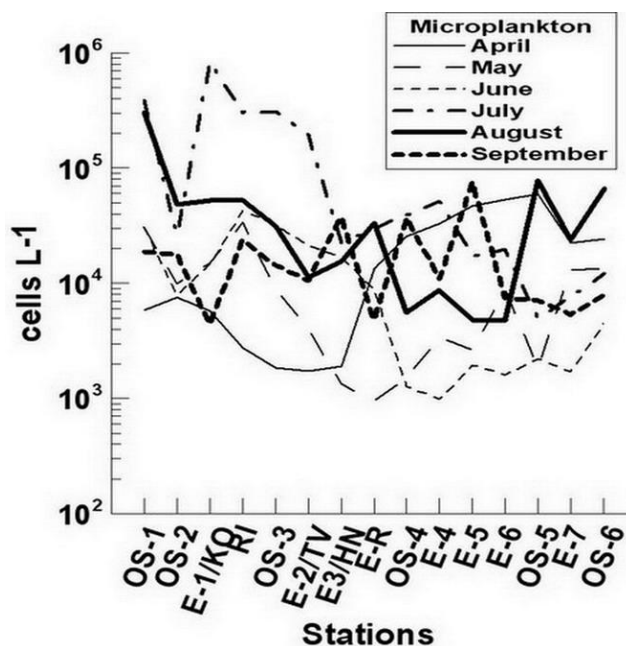


Fig. 2. Means values of microplankton abundance

Diatoms dominated the phytoplankton community throughout the study period with maximum on surface ( $2.51 \times 10^6$  cells L<sup>-1</sup>) in July. Abundance of dinoflagellates increased in summer, but diatoms were the most abundant. Some species appeared throughout the study. Some of them are: *Thalassionema nitzschoides*, *Pseudonitzschia* spp., *Prorocentrum micans*, *Gymnodinium* spp. Concentration of chlorophyll *a* in August was  $2.675 \text{ mg/m}^3$ , when the fourth peak of microplankton abundance occurred. In July concentrations were lower (from  $0.80$  to  $1.69 \text{ mg/m}^3$ ). These changes can be explained by different photosynthetic activities, in different cell size fractions, and different phytoplankton composition [4].

## Conclusion

Maximum values of phytoplankton abundance and diversity in the summer period were caused by untreated sewage waters. The change of environmental conditions due to human activities in the Montenegrin coast are rapid, and permanent seawater monitoring is necessary.

## References

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