

# DIVERSITY AND ABUNDANCE PATTERNS OF PHYTOPLANKTON IN COSTAL WATERS OF THE NORTHERN ADRIATIC

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## Abstract

The distribution and abundance of different phytoplankton groups and species composition are described for coastal waters along the Istrian peninsula and Kvarner Bay, in the northern Adriatic. Hydrochemical and biological properties were investigated during one year. The coastal system is rather heterogeneous due to the influence of several rivers and other anthropogenic inputs in the system, but also due to hydrography and complex circulation system in this area. The microphytoplankton community was dominated by diatoms while the dinoflagellates appeared when the nutrients were scarce, generally after the diatom blooms. The general trend followed expected succession patterns.

**Keywords:** *Adriatic Sea, Phytoplankton, Coastal Waters*

## Introduction

Along the northern Adriatic (NA) coast the ecological factors (anthropogenic, like e.g. nutrient input as well as naturally e.g. bathymetry and river outflows) are diverse. Hence the phytoplankton community is under equally diverse influences and any disturbance in marine ecosystem is strongly affecting the primary production at the first trophic level.

*Pseudonitzschia* species which were pronounced especially along the Western Istrian stations ( $4.2 \times 10^5$  cell/l Fig.2.). The peak cell abundance of the spring/summer bloom was recorded in June in the surface layer of Rijeka Bay where *Skeletonema spp.* reached  $3.6 \times 10^5$  cell/l, while the deeper water layers were dominated by Coccolithophoridae like *Emiliana huxleii* ( $1.1 \times 10^5$  cell/l). The Rijeka Bay can be described as mainly influenced by the harbour city of Rijeka and the karstic Rječina river, where the nutrient rich fresh water input triggered the *Skeletonema sp.* bloom only in this restricted region. Phytoplankton community structure allowed to discriminate different regions along the NA coast.

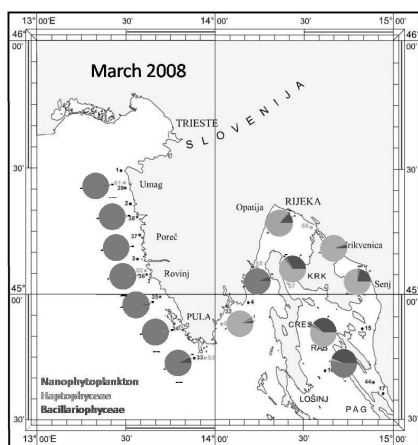


Fig. 1. The investigated area with the sampling stations. The piecharts show the phytoplankton community structures in March 2008.

## Materials and Methods

Water samples were collected during seven cruises at 15 stations, each, one, nautical mile from the Istrian coast and Kvarner Bay (NA) during 2007 and 2008 (Fig.1). Temperature and salinity were measured using a CTD probe (Seabird, USA). A total of 315 water samples were analyzed during the study period. Samples were collected with 5 L Niskin bottles, subsamples for the determination of the nutrients were performed using standard oceanographic methods (1). Phytoplankton samples were preserved in 2% (final concentration) neutralized formaldehyde and analyzed following the Utermol method (2) on Zeiss Axiovert 200 inverted microscope. For statistical analysis the software packages Systat 12 and Primer 6 were used.

## Results and discussion

A total of 237 species were recorded. There were 126 species of Bacillariophyceae, 83 Dinophyceae, 13 Haptophyta and 5 species of Crysophyta while nanoplankton fraction was divided in 10 distinct groups (diatomeae, dinoflagelata, cryptophyta, chlorophyta, coccolithophoridae.). Statistical analysis of the phytoplankton community structure showed that the stations along the western Istrian coast were significantly different from the stations along the eastern Istrian coast and in Kvarner Bay (Fig.2). The nanophytoplankton component was the dominant plankton guild throughout the whole year in the NA while the microphytoplankton (size >20 μm) was restricted to sporadic (late spring and autumn) blooms. During the investigated period the most prominent bloom event was the autumn bloom (October 2007, September 2008) characterized mostly by diatoms. The phytoplankton community during the bloom was dominated by *Chaetoceros* species and

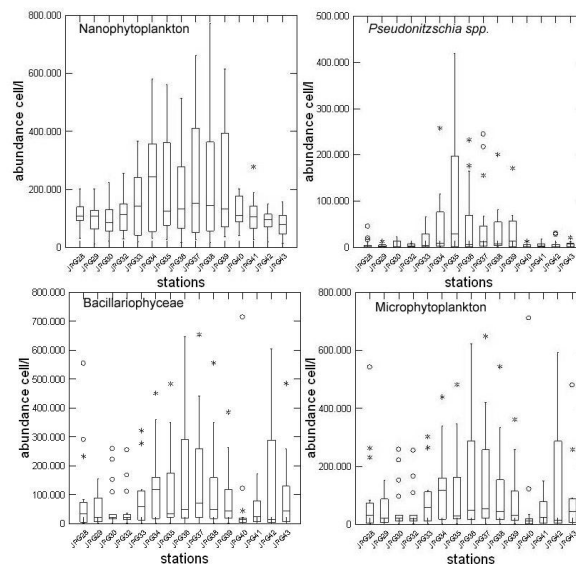


Fig. 2. Abundances of main phytoplankton groups and *Pseudonitzschia spp.* with the distribution over the stations

## References

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