

THE INFLUENCE OF THE PO RIVER ON THE PRIMARY PRODUCTION OF
THE NORTHERN ADRIATIC WITH COMMENTS ON THE IMPORTANCE
OF THE NANOPLANKTON

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SUMMARY

The importance of the nanoplankton (<20 μ m) contribution to the total production of the Northern Adriatic, an area strongly influenced by the Po river discharge, is presented and discussed.

RÉSUMÉ

L'importance de la contribution de nanoplancton (<20 μ m) à la production primaire de la mer Adriatique septentrionale, une région influencée fortement par les débits de la rivière Po, est présentée et discutée.

INTRODUCTION

The Northern Adriatic is the most productive basin of the Mediterranean, primarily because of its shallowness combined with the nutrient input from the Po and other Northern Italian rivers. The primary production of the region has been studied by CMR since 1966 (e.g. Kveder et al, 1971; Revelante and Gilmartin, 1976) with observations concentrated along a transect reaching from the Istrian Peninsula in Yugoslavia to the Po Delta in Italy.

MATERIALS AND METHODS

Primary production was measured by the C¹⁴ method, chlorophyll a fluorimetrically, while the nanoplankton fraction was obtained by differentially filtering seawater through No. 25 TII (20 μ m) net discs and GF/C Whatman Glass filters.

RESULTS AND DISCUSSION

Data on chlorophyll a biomass, primary production, and microplankton: nanoplankton ratios (since 1971) are presented, which document the temporal and spatial patterns of influence

the Po river discharge has on the primary production characteristics of the region.

The data depict a typical temperate latitude phytoplankton cycle, with spring and fall blooms, strongly modified by the current annual discharge characteristics of the Po river. Over the 10 year period the data suggest a long term trend to increased phytoplankton biomass and rates of primary production, culminating in 1977 when the highest crops on record in the eastern Adriatic were observed. Indirect evidence indicate these changes resulted from a combination of atypical climatic events and/or anthropomorphic eutrophication. Evidence implicates the nanoplankton (smaller than 20 μ m) as the most important component of the crop, being responsible, on the average for 60-90% of the primary production. Microplankton only dominated the crop following pulse inputs of nutrients associated with river discharge maxima.

The data emphasize the importance of the nanoplankton, a size class, which because of their size have tended to be overlooked when cell density estimation techniques are used to analyze communities. Since a high proportion of primary production potential is concentrated in the nanoplankton size class, all further Adriatic studies should be designed to estimate the relative contribution of the nanoplankton to total primary production. It is recommended that 20 μ m be accepted as the size generally used to distinguish nanoplankton from microplankton.

R e f e r e n c e s

- KVEDER, S., REVELANTE, N., SMODLAKA, N. and ŠKRIVANIĆ, A., 1971. - Some Characteristics of Phytoplankton and Phytoplankton Productivity in the Northern Adriatic. *Thalassia Jugosl.*, 7:151-158
- REVELANTE, N. and GILMARTIN, M., 1976. - The Effect of Po River Discharge on Phytoplankton Dynamics in the Northern Adriatic Sea. *Mar. Biol.*, 34:259-271.

DISCUSSION

Questions and comments:

1. Have you tried to compare chlorophyll data with classical phytoplankton counting and with data obtained by using the Coulter Counter? (B. CESCO, Italy)
 - We could not find out correlation between chlorophyll data and phytoplankton counting values. We have not performed Coulter Counter analysis for those purposes.

2. The summer bloom can be due to significant changes in Po river waters or the stratification of Adriatic waters is the major factor? (A. BALLESTER, Spain)
 - Phytoplankton summer bloom is due to the combined effects of Po river outflow and stratification.

3. Whether the 3 peaks of the phytoplankton bloom you have found around the Po mouth are only limited to this specific area or can be generalized to other areas of river input in the Mediterranean? (R. FUKAI, Monaco)
 - It is difficult to believe that summer blooms are specific for the investigated area. It would be interesting to compare our data with results obtained in other Mediterranean estuaries with recognition of the environmental differences.

