T PUCHER-PETKOVIC and I MARASOVIC

Institute of Oceanography and Fisheries, SPLIT (Croatia)

The Institute of Oceanography and Fisheries has performed the monitoring of physical, chemical and biological properties of the sea water at five stations in front of major Dalmatian towns (Zadar, Sibenik, Split, Ploce and Dubrovnik) ever since 1976.

The present paper presents the results of 14-year research of plankton parameters (phytoplankton density and biomass, zooplankton biomass, and diatom/dinoflagellate ratio), and the most important factors affecting this community (N-salts, P-PO4, O2 saturation, transparency). Data used were from Institute's internal publication (Studies and Reviews, 1977-1991).

Sibenik Bay was chosen (station S1) as an area of the highest, IV trophic level of Dalmatian area (VILICIC, 1989). Progressive eutrophication has caused very prominent changes in the plankton community which should be emphasized.

Plankton parameters are an order of magnitude higher here than at other stations. Sibenik Area Station S1 Position: 43°44′0″N; 15°53′5″E, Depth: 32 m Krka River discharges and town effluents are principal sources of eutrophication.

Surface layer, where photo-

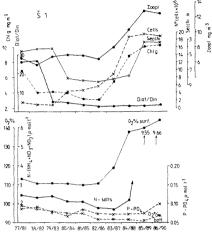


Fig.1 : Annual trend in biological and chemical parameter in the Sibenik area, expressed as 5-year running averages.

Surface layer, where photo-synthetic activity is most intensive, was taken into account, except for O₂%. Ob-servations are for summer only. This layer is most servations are only. This la only. This layer is most strongly affected by land runoff in summer due to intensifica-tion of municipal intensifica-tion of municipal effluent discharge and the presence of a pycnocline. Fig. 1 shows the variations of studied parameters. As of 1980/84, biological parameters have constantly increased, reaching the highest values for the most recent annual series. Surface chlorophyll a, observed over 5-year phyll a, observed over 5-year periods, ranged from 2.84 to 11.65 mg m⁻³, phytoplankton density from 1,800 to 19. 400 x 106 cells 1-1, whereas zoowhereas plankton biomass varied from 5.7 to 12.8 mg m⁻³ (ver-tical hauls), REGNER (1991) tical hauls), REGNER (1221), recorded progressive changes in zooplankton copepod community between 1985 in zooplankton copepo community between 198 and 1988, ascribing them t coastal water eutrophication them to

Sibenik area, expressed as 5-year running averages.

Progressively higher oxygen saturation points are ascribed to increased photosynthetic activity in the surface layer. Although O₂ saturation had never been below 100%, it has recently reached values as high as 140%. However, bottom oxygen saturation tends to decrease as expected, even though the station is rather shallow.

Higher plankton quantities induced a reduction in the sea water transparency. Phytoplankton composition has also changed, so that the diatom to dinoflagellate ratio has been considerably altered in favour of dinoflagellates. Prorocentrum minimum, one of the species taking part in summer phytoplankton blooms in this area, has developed ever more intensive summer blooms (MARASOVIC, 1990). A greater proportion of dinoflagellates in the phytoplankton community, as a consequence of environmental enrichment, is well known in other coastal areas of the eastern Adriatic, as well (MARASOVIC and PUCHER-PETKOVIC, in press).

Whereas phosphates remained at the same level throughout the period of our research, the most recent annual series show an enormous increase of N-salts, particularly nitrates.

To conclude, described changes have in fact taken place in a relatively short time. The continuity of these processes are of serious concern, since they are indicative of the fact that natural fluctuations have been overwhelmed by land effects.

REFERENCES

MARASOVIC I., 1990.- Studies of toxic dinoflagellate species in the inshore waters of the eastern Adriatic coast. FAO, MAP Technical Series, 40:12 pp.

MARASOVIC I. and T. PUCHER-PETKOVIC., (in press).- Eutrophication impact on the species composition in natural phytoplankton community. Acta Adriat., 32 (2).

PUCHER-PETKOVIC T., 1989.- Etude des fluctuations pluriannuelles du phyoplancton dans les eaux de l'Adriatique moyenne. Nova Thalassia, 10, Suppl. 1.

REGNER D., 1991.- The progressive changes of the copepod community form the eastern Adriatic coast caused by eutrophication. Toxic. Environ. Chem., 31/32: 433-439.

VILICIC D., 1989.- Phytoplankton population density and volume as indicators of eutrophication in the eastern part of the Adriatic Sea. Hydrobiologia, 174: 117-132.