

PLANKTON INVESTIGATIONS OF THE CANAL NAVIGABLE BEGEY (VOYVODINA, SERBIA)

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ABSTRACT

The phytoplankton type-specific community as one of biological elements in an estimate of changes in the quality of water of The Danube-Tisza-Danube canal system (HS – DTD) in Serbian Banat region was the subject of our recent research. Halophyllic phytoplankton community of an eutrophic type have been already described [6].

On the basis of the plankton community structure and chemical analyses an transboundary pollution entering the waters of DTD canals has been pointed out. At the boundary profile - Srpski Itebey the investigated bacterioplankton, especially coliforms showed significant number.

Comparing studied biological and chemical parameters, the considerable autopurification ability of canal water have been recorded.

KEY WORDS:

phytoplankton, biological elements, WFD, Navigable Begey, quality of water, Danube-Tisza-Danube canal system (HS – DTD)

1. INTRODUCTION

The quality elements for the classification of ecological status/potential are listed in Annex V Section 1.1 of the WFD [3]. According to Anon 2003b, establishing of methods/tools for assessing ecological status/potential for the both biological and physico-chemical quality elements are needed [1].

Also, elements of the level of confidence and precision of the results provided by the monitoring programmes should be given in the River Basin Management Plan [3,1].

Correspondingly, chosen biological element - phytoplankton revealed that the investigated canal section Srpski Itebey – Klek was classified as

a body of water of good ecological status/potential, except for the last part of the Canal near Stayicyevo locality, which was of a moderate ecological status/potential.

2. MATERIAL AND METHODS

The reseach has been caried out during 2003/2004 year at three sampling sites: Srpski Itebey, Klek and Stayicyevo of The Canal Navigable Begey. Determination of algal species was made using light microscopy (LM) and scanning electron microscopy (SEM).

Quantitative analyses were made according to Németh & Vörös [7], and the number of bacteria was estimated as it is described in Petrović *et al.*'s manual [8]. Chlorophyll *a*, and chemical analyses were determined using standard methods (APHA, 1995) [2].

Water phosphatase activity was determined in original, untreated water sample on p-Nitrophenylphosphate as a substrate for biochemical indication of water organic load (aquatic microorganism heterotrophic activity), as it was described earlier [5] .

3. RESULTS AND DISCUSSION

According to the results obtained (Fig.1, 2, 3), the succession of water selfpuriffication in canal Navigable Begey and dilution of pollutants at sampling site Klek, located downstream of the referal sector of DTD canal, have been shown.

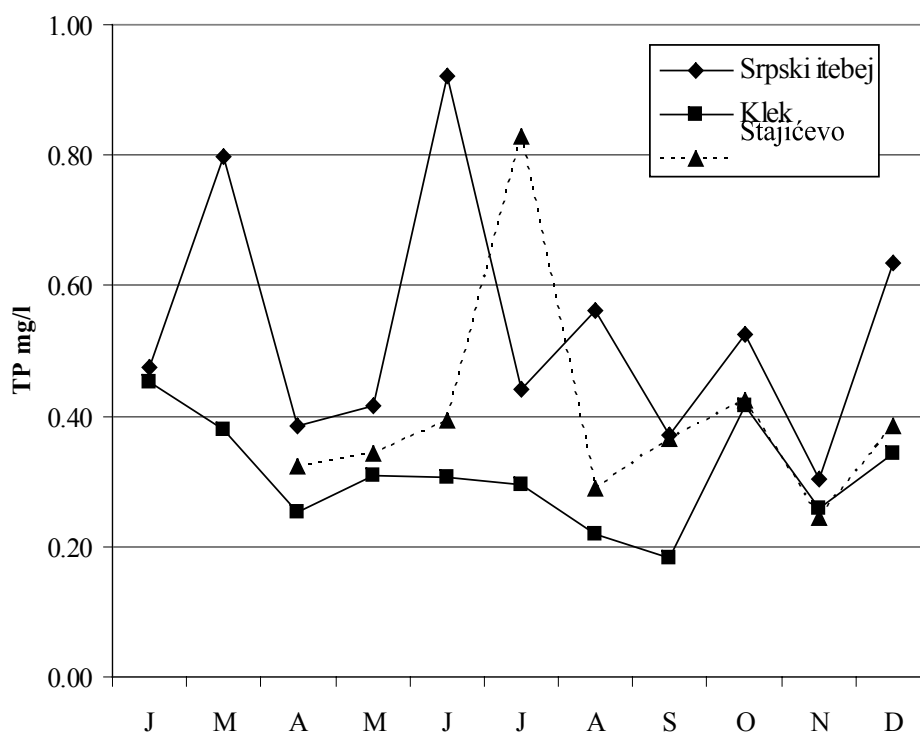


FIG. 1. AVERAGE VALUES OF CONCENTRATIONS OF TOTAL P (mg/l) BY MONTHS (2003. year)

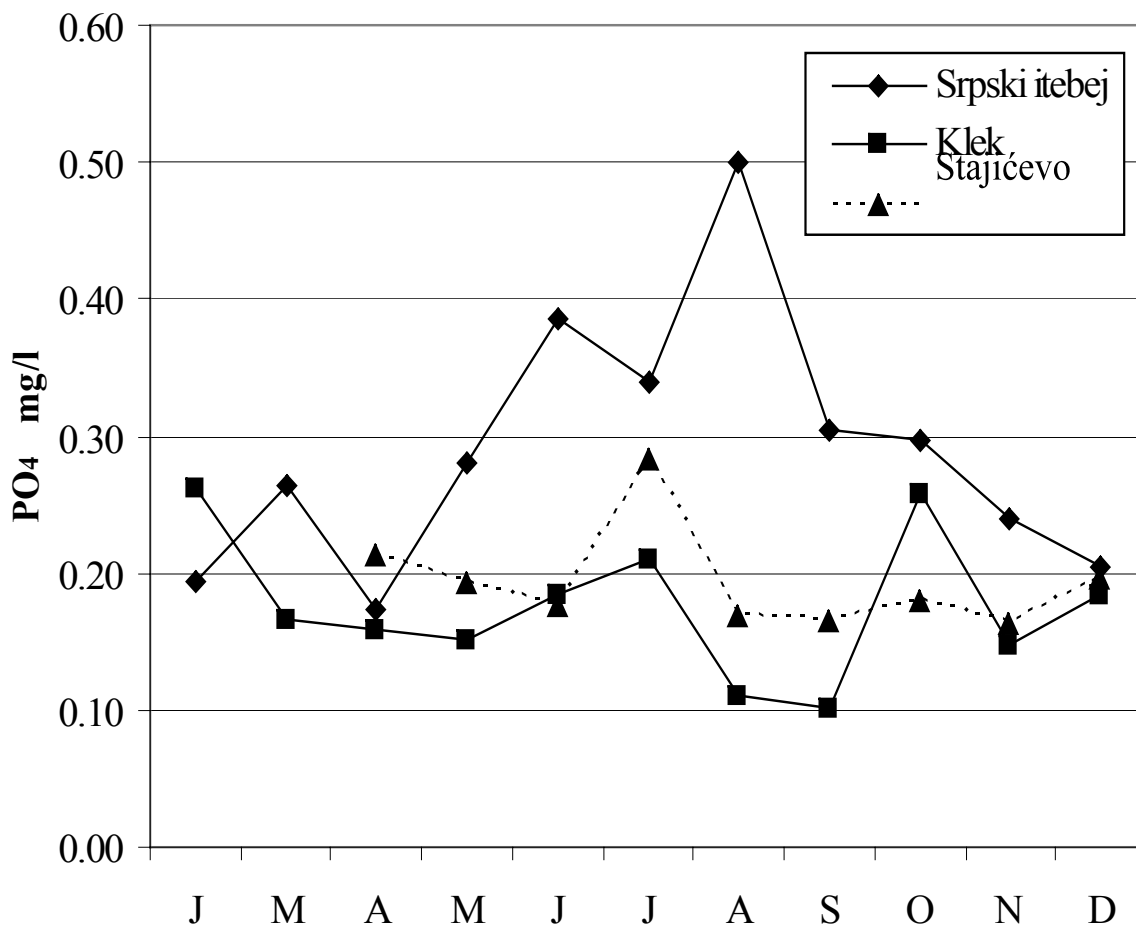


FIG. 2 . AVERAGE VALUES OF CONCENTRATIONS OF PO₄ (mg/l) BY MONTHS (2003. year)

The decrease of total phosphorus pointed out aquatic microorganism's heterotrophic activity. Stayicyevo sampling site has high algal production (in summ. Chl. *a* 52.33mg/l) what revealed poor trophic status and EQR [1]. Simultaneously, nutrients availability also support high productivity of bacterioplankton in investigated canal, and the number of heterotrophic bacteria was the greatest during spring and autumn season. The number of total coliforms corresponds with dynamics of ammonium ion, what also pointed out to the water fecal pollution.

Composition of phytoplankton at sampling site Srpski Itebey was characterized by eutrophic species of diatoms [4] and other algal groups. In the course of the presence of high amount of ammonium (>1.50 mg/l) dominant were found to be Cyanobacteria (36%), and diatoms: *Anomoeoneis sphaerophora*, *Diatoma vulgare*, *Melosira varians*, *Nitzschia sigmaidea*, and Chrysophyceae with *Synura uvella* (18%).

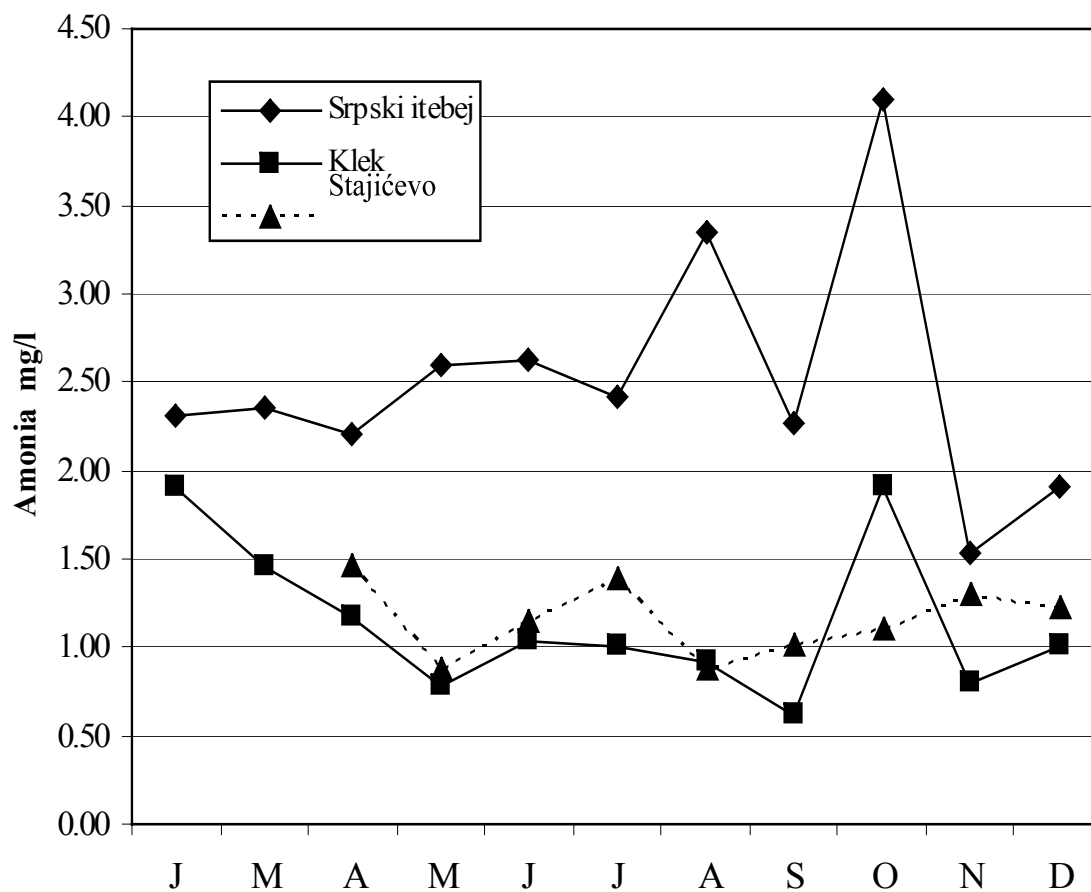


FIG. 3. AVERAGE VALUES OF CONCENTRATIONS OF NH4 (mg/l)

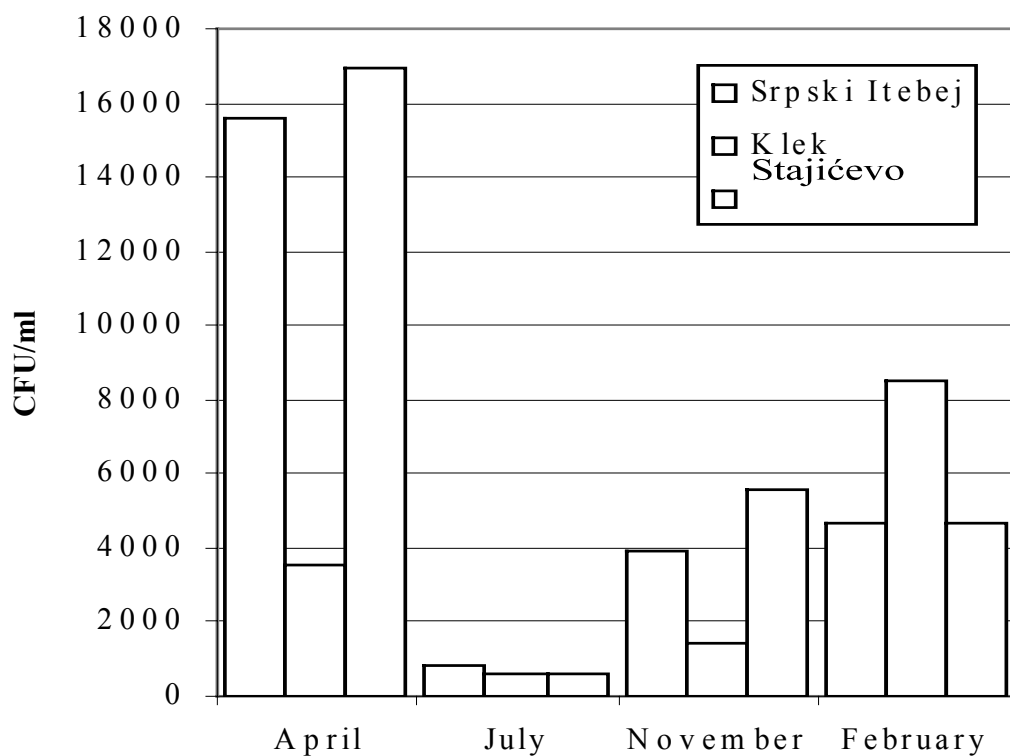


FIG. 4. TOTAL NUMBER OF COLIFORMS (CFU/ml)

In the water sampled at the Klek locality this species appeared in the next season. i.e. in winter. At sampling site Stayicyevo green algae were dominant in summer, and in the autumn the abundance of *Euglena proxima* indicated high water trophic level. It is important to mention the presence of halophyl diatoms such as *Bacillaria paradoxa* and *Entomoneis paludosa* (Fig. 5) which were present during cold period [5].



FIG. 5. SEM: BACILLARIA PARADOXA AND ENTOMONEIS PALUDOSA magn. 1400 x.

Investigated canal stretch have an unique type-specific algal community contributing to the algal biodiversity richness of Voyvodinian surface freshwaters which, in our opinion should be protected from pollution impact.

4. CONCLUSION

According to the plankton community composition, their enzyme activity, and chemical parameters, the trend of selfpurification processes could be estimated. Biological element – phytoplankton used in the assessment of ecological status/potential reflects slight changes in water quality what is in accordance with Anon 2003b. Thus, we propose use of coliforms in ecological classification, which would give us more confidence in the estimation of true ecological potential and the assessment of human impact.

5. REFERENCES

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