The large scale spatial distribution of plankton communities in a transitional coastal lagoon

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INTRODUCTION

Lagoons and estuaries are extremely dynamic environments, characterised by high variability physical processes coupled with a wide variety of hydrochemical conditions. The interplay of strong gradients in river flow, mixing, nutrient inputs, salinity and temperature produces spatially and temporally heterogeneous condition for plankton communities.

The aim of this study was describe patterns of plankton spatial heterogeneity and evaluate impact of environmental factors on plankton communities spatial variability along river-lagoon gradient.

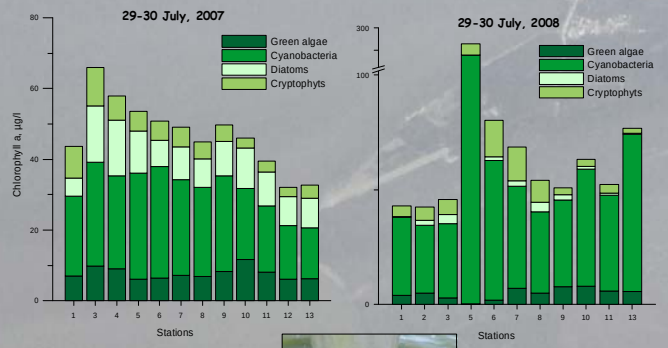
MATERIAL AND METHODS

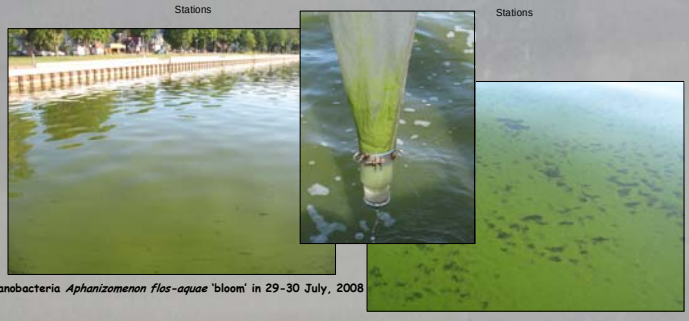
The samples of plankton including ciliates, phytoplankton, metazooplankton and bacteria were collected at 13 stations during cruises on July 29-30, 2007 and 2008. The physico-chemical parameters: Secchi distance, pH, temperature, salinity, current velocity and dissolved oxygen were also measured in each station.

The relationship between dominant ciliate species and environmental factors was estimated by multivariate statistical method RDA (Redundancy analysis).

PHYTOPLANKTON DISTRIBUTION

During both years the Cyanobacteria dominated in the phytoplankton community, however, in year 2007 the *Planktothrix agardhii* dominated, while in year 2008 - the *Aphanizomenon flos-aquae* was the most abundant. The huge concentration of the Chl *a* of the Cyanobacteria in Nida station (No. 5) was due to prevailing not to strong East - Southeast winds that drifted the phytoplankton.



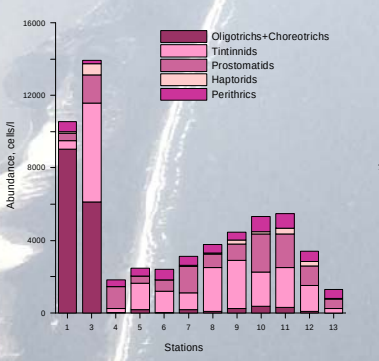


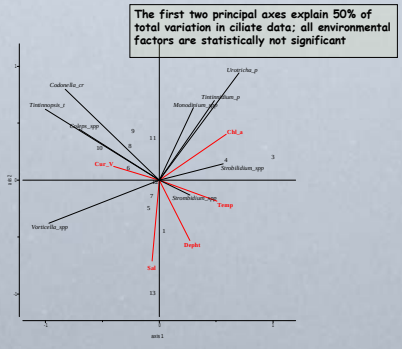
Cyanobacteria *Aphanizomenon flos-aquae* 'bloom' in 29-30 July, 2008

PLANKTON CILIATES DISTRIBUTION

July 2007

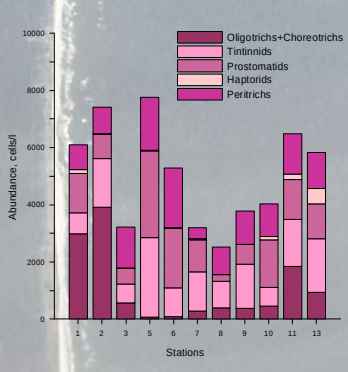
The highest ciliate abundance was found in the Nemunas river avandelta (stations 1, 3), oligotrichs (*Strombidium spp.*) and naked choreotrichs (*Strombilidium spp.*) were the major component of ciliate assemblage. These species had tendency positively correlate with chlorophyll a and temperature, however these relations were not significant.
Prostomatids (*Coleps spp., Urotricha pelagica*) and tintinnids (*Tintinnidium pusillum, Tintinnopsis tubulosa, Codonella cratera*) dominated in the lagoon ciliate assemblage (4-13 stations). *T.pusillum* and *U. pelagica* were associated with higher Chl a concentration, while *Coleps spp., C. cratera, T. tubulosa* species - with current velocity. Other ciliate groups peritrichs (*Vorticella spp.*) and predaceous haptorids (*Modnodinium spp.*) were found in low densities.

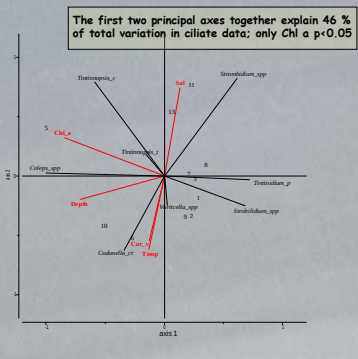




July 2008

In 2008 July the Nemunas river avandelta (stations 1,2) ciliate assemblage was dominated by naked choreotrichs (*Strobilidium spp.*)., these species negatively correlated with Chl a. Oligotrichs *Strombidium* genera species dominated in northern part of the lagoon (stations 11, 13) and their abundance were associated with salinity. Prostomatids (mostly *Coleps hirtus*) varied between stations, the highest its abundance was registered in station 5, correlated with Chl a concentration. Also *Tintinnopsis* genera species abundance correlated with Chl a, while *Tintinnidium pusillum* showed opposite pattern.
Peritrichs (*Vorticella spp.)* was more noticeable component of ciliate community in 2008 than in 2007. They contributed between 10 to 47 % total ciliate abundance. *Vorticella* spp. positively correlated with temperature and current velocity, negatively with salinity, however these relations were not significant.





CONCLUSIONS

During both years July the same pattern of spatial ciliate distribution was found: strong dominance of small naked choreotrichs *Strombilidium spp.* in the Nemunas River avandelta stations shifted towards the large tintinnid species *Tintinnidium pusillum*, *Codonella cratera*, *Tintinnopsis tubulosa* and prostomatids (*Coleps spp.)* in the lagoon stations.

The influence of main environmental factors (temperature, salinity, current velocity, depth, except Chl a) on the dominant plankton ciliates species distribution were not statistically proved ☹.