Research Article

Impact of Hydrological Regime in Algal Distribution in Lotic and Lentic Water

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ABSTRACT

The main objective of this investigation is to assessing the impact of hidrology in algal distribution in lotic and lentic waters. We have investigated the number of algae in lotic (river) and lentic (lake) waters. As lotic water we have investigated the Ereniku river, while as the lentic water we investigate the Radoniq lake, during the spring season 2012. As result for impact of hydrology (flow velocity) we registered the higher number of algae in lentic water (lake), in comparison of lotic water (river). We registered 78 algal species in lentic (lake) waters, while in in lotic (river) waters registered 47 algal species.

Keywords: spring, algae, hidrology, lotic, lentic, water,

INTRODUCTION

Hydrological processes are key factors in controlling the productivity and development of floodplain lakes. Overbank floodings change biotic and physico-chemical properties of aquatic habitats and allow for the exchange of matter and organisms among the ecosystems. During floods, a floodplain retains particular organic matter (POM) and can be an important source of organic compounds and plankton development [1, 2].

After a flood event more homogenous distribution of the phytoplankton and decrease in its abundance and biomass was reported by Kasten[3].

In the phase of low water, when periodic isolation of lentic floodplain lakes occurs, higher phytoplankton abundance and biomass was recorded [4, 5].

During low water periods the most significant differences between riverine and floodplain lake phytoplankton communities, in terms of the phytoplankton structure, have been stated as well [6].

The hydrologic regime is closely related to seasonal changes in climate. In regions with a warm climate, the hydrologic regime is affected mainly by atmospheric precipitation and evaporation; in regions with a cold or temperate climate, the air temperature is a leading factor. The hydrologic regime of rivers manifests itself by daily, ten-day, monthly, seasonal and long term fluctuations. It consists of a number of characteristic periods (phases) that vary with seasonal changes in the conditions under which rivers are fed.

The hydrologic regime of lakes is determined by the relationship between the amount of amount of precipitation reaching the lake's surface, evaporation, surface and underground flow into the lake, and surface and underground outflow of water from the lake, as well as by the size and shape of the lake, pattern of change in the surface area with change in level, and wind activity, which determines the size of the waves and the extent to which the level rises and falls. Fluctuations in the lake level may be seasonal, annual, or short-term

MATERIALS AND METHDHODS

Phytoplankton was collected twice during the spring season of 2012 year. The samples were taken from three locality of the Radoniqi lake and the river Ereniku.

Phytoplankton abundance was determined Using Hemocytometer. Velocity of water in river is measure using a floating object. Measured distance wasf 10m.

Identification of the species was carried out using classic literature [7-12].

RESULTS AND DISCCUSIONS

During the study period (spring season 2012), the water level of the Ereniku river oscillated between 0.55 and 0.86 m (high water) and between 0.23 and 0.34 m (low water). The highest water level was registered in second and third locality, while the low level was registered at first locality.

In lentic (lake) waters we have registered 78 algal species, while in lotic (river) waters we have registered 47 algal species.

In lentic system (lake) the dominant group of algae was Bacillariophyta with 47 species, followed by Cyanophyta with 13 species, Chlorophyta with 11 species, Euglenophya with 5 species and Xanthophyta with 2 species.

In lotic system(river) also the dominant group of algae was Bacillariophyta with 30 species, followed by Cyanophyta with 7 species , Chlorophyta with 6 species, Euglenophya with 3 species and Xanthophyta with 1 species.

A considerable role among the variables was played hydrological conditions: water retention time and water level. These can be explained by the difference in the number of algae in lentic and lotic system, where in lentic water the number of algae was higher for 31 species.

Table 1: Determined algae in waters of lentic system(lake Radoniq) and lotic system (river Erenik) during spring season 2012 year.

Divisions		Number of species of algae in Lentic system- lake	Number of species of algae in Lotic system- river
Total number in water		78	47
	Cyanophyta	13	8
1	Anabaena plantonica	+	
2	Chroococcus cochaerens	+	+
3	Dactylococcopsis acicularis	+	
4	Lemanea annulata	+	+
5	Merismopedia tenuissima	+	+
6	Microcystis grevillei	+	
7	Nodularia spomigena	+	
8	Nostoc punctifrome	+	+
9	Oscillatoria mirabilis	+	+
10	O.nitida	+	+
11	Phormidium ambiguum	+	
12	Spirulina platensis	+	+
13	Tolypothrix tenuis	+	
	Baciallariophyta		
1	Asterionella formosa,	+	+
2	Achnantes hungarica(Gunow)	+	
3	A.ventralis(Krasske)Lange-Bertalot	+	+
4	**Amphora** lybica (Ehrenberg)	+	+
5	Amphora normani (Rabenhorst)	+	
6	**Cocconeis** pediculus (Ehrenberg)	+	
7	Cocconeis placentula (Ehrenberg)	+	+
8	C.placentula var. lineata(Ehrenberg) Cleve	+	+
9	**Craticula** accomoda(Husted t)Mann	+	+
10	**Centronella** reichelti(Voigt)	+	
11	**Cyclotella** ocellata(Pantoseck)	+	+
12	**Cymatopleura** solea (Brebisson)W.Smit h	+	+
13	**Cymbella** affinis (Kützing)	+	+
14	C.helvetica (Kützing)	+	
15	C.naviculiformis(A uerswald)Cleve	+	+
16	**Diatoma** ehrenbergi Kützing	+	
17	D.monoliforme (Kützing)	+	+
18	D.vulgaris (Bory)	+	+
19	**Epithemia** adnata (Kützing)	+	
20	**Fragilaria** ulna(Nitzh.)Lange-Bertalot	+	+
21	F.ulna complex oxyrhynchus (Lange-Bert.)	+	+
22	**Frustulia** vulgaris(Thwaites) DeToni	+	
23	**Gomphonema** microporus (Kützing)	+	+
24	**Navicula** cryptotenella (Lange-Bertaolt)	+	+
25	Navicula lanceolata(Agardh)Ehrenberg	+	+
26	Navicula radiosa (Kützing)	+	
27	Navicula tripunctata(O.F.M üller)Bory	+	+
28	Navicula trivialis (Lange-Bertalot)	+	+
29	**Nitzschia** acula (Hantzsch In Rabenhorst)	+	+
30	N.capitellata	+	

	(Hustedt)		
31	N.constricta (Kützing)	+	+
32	N.dissipata(Kützing)Grunow	+	
33	N.exilis (Kützing)	+	
34	**Pinnularia** microstauron(Ehren.)Cleve	+	+
35	P.microstauron var.brebissonii(Kützing)	+	
36	**Planothidium** ellipticum(Cleve)Round	+	+
37	P.lanceolatum(Brebisson)Round	+	
38	**Reimera** sinuata(Greg.)Kociolek&Stoemer	+	+
39	**Rhoicosphenia** abbreviata(Kützing)Grun	+	+
40	**Sellaphora** pupula (Kützing)	+	
41	S.pupula fo. Rostrata(Hustedt) Bukhtiy.	+	+
42	**Stauroneis** smithi (Grunow)	+	+
	Surirella angusta Kützing)	+	+
43	S.linearis (W.Smith)	+	
44	S.minuta (Brebisson in Kützing)	+	
45	**Synedra** ulna(Nitzsch)Ehrenberg.	+	+
46	S.acus(Hustedt)	+	
47	S.nana (Meister)	+	+
	Division XANTHOPHYTA		
1	Cryptomonas ovata (Ehrb.)	+	+
2	Ophiocytum gracillimum(Borz.)	+	
	Division EUGLENOPHYTA		
1	**Euglena** viridis (Ehrenbeg)	+	+
2	E.terricola (Dang.)Lemm	+	
3	E.oblonga (Schmitz.)	+	+
4	E.pisciformis (Klebs)	+	+
5	**Phacus** hispidulus Lemm.	+	
	Division CHLOROPHYTA		
1	**Cladophora** fracta(Roth) Kütz	+	+
2	C.fracta var. lacustris (Roth) Kütz	+	+
3	C glomerata (L) (Kütz)	+	+
4	**Closterium** archerianum Cleve	+	
5	C attenuatum Ehreb.	+	+
6	C.gracilis (Breb.)	+	
7	C. moniliferum Nitzsch	+	
8	C.parvulum Naegeli	+	+
9	C.praelongum (Breb.)	+	
10	C.pseudolunula Borge.	+	
11	**Stigeoclonium** tenue	+	+

Although the hydrological regime is considered the main functioning force in the structure and function of river-floodplain systems (e.g. Junk 1996, Neiff 1996), the type of the system exerted a greater influence on the species composition and richness of periphytic community in the Ereniku river floodplain [13].

Our results are in accordance with results of other authors, such as Kasten [3].

Our research confirmed that the lower abundance of phytoplankton is in the river.

However, total phytoplankton abundance in the Ereniku river was much lower than that stated for some other lowland rivers, (e.g. the Morava and Narew rivers), so our results are in accordance with results of Hindák and Grabowska [14,15].

CONCLUSION

Based in our investigation we can conclude that the number of algae in lentic waters is higher compared with lotic waters. Dominante group of algae in lentic and lotic waters was Bacillariophyta.

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