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Algocenosis of lake Radoniqi (Kosovo), during spring season 2013

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SUMMARY

The investigation is done during spring season 2013 year. The determined taxa of the Lake Radoniqi are 104 species of algae, belonging to 5 divisions, were found. By their abundance the algae from the division Bacillariophyta predominated in all areas of the longitudinal profile of the lake and by their relative occurrence. Bacillariophyta 64 taxa (61.53%), Chlorophyta 14 taxa (13.46%), followed by Cyanophyta and Euglenophyta with 12 taxa (11.53 %) and Xanthophyta 2 taxa (1.92%). Determined 40 bioindicators species, where dominate bioindicators species (22) which belongs to Bacillariophyceae. Chlorophyta bioindicators species are 7 species, Euglenophyta bioindicators species are 6 species, Cyanophyta bioindicators species are 5 species. While the Xanthophyta bioindicators species are not

2013 .
 104 ,
 5 .
 Bacillariophyta
 Bacillariophyta 64
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 (13.46%), Cyanophyta
 Euglenophyta 12 (11.53%)
 Xanthophyta 2 (1.92%).
 40 ,
 22 ,
 Bacillariophyceae:
 Chlorophyta
 7 , Euglenophyta 6 ,
 Cyanophyta 5 .

Xanthophyta

registered. Based to these investigation can conclude that the water belongs to the betamesosaprob level.

Key words: algocenosis, water, lake, spring, Radoniqi

INTRODUCTION

(Khan, 2011).

The algae have been an interesting group for investigation because of their very primitive nature and a world-wide distribution, which is due to their capability to exist under most varied environmental conditions (Khan, 2011).

Fresh water algae are producer of aquatic ecosystem as they are source of food. Further studies are required to make extensive collection and identification of fresh water algae and other algae from various lakes and of Kosovo.

Rivers and lakes, especially in industrialized areas most exposed to pollutants such as heavy metals or hazardous organic pollutants. It is known that the water quality can be affected by chemicals such as pH, hardness, and oxygen. The changes in concentration can increase the toxicity of pollutants.

Biomass of phytoplankton is considered as one of the most promising methods for assessing aquatic ecosystems in terms of the functioning of the primary autotrophic link. Data of

phytoplankton in rivers and lakes indicate the presence and transformation of pollution, and can characterize the level of self-purification of aquatic ecosystem. It is also known that in the process of contamination of aquatic ecosystems, the preavailable species saprobity shows the presence of organic pollution of water (Hambaryan, 2013).

The samples were collected from 3 sampling sites: edge of lake (1), middle of lake (2) and near aqueous (3) along the Radoniqi Lake during the spring seasons: spring 2013. Water samples were collected in 500 ml glass bottles, 10 cm beneath the water surface, using standard methods (Hindak, 1978). Conductivity, pH, salts, TDS (Total Dissolved Salts), were measured on site using portable instruments (HACH), O₂ was measured with portable instruments, such as, oxygenometer (Hana Instrument) and nutrients (N, P, Si) were analyzed by standard methods (DEV, 1981). Epilithon was brushed from the stones using a toothbrush and the upper layer of epipelton was drawn up via a vacuum suction system and then pipetted (Sladeckova, 1962). Epiphyton was sampled from the substrate and placed in the plastic bottles.

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MATERIAL AND METHODS

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Leica, Fujifilm, Krammer & Lange-Bertalot (1986-2000).
 : *Bacillariophyta*: Kramer & Lange-Bertalot (1986, 1988, 1991a, 1991b).

The diatoms were examined using a Leica microscope, with a digital camera Fujifilm, which photographed the algae directly from the sample.

Diatoms cleaning

Cleaning of diatoms' frustules and the preparation of slides and their determination was done according to Krammer & Lange-Bertalot (1986-2000).

Diatoms' identification was done according to the keys: *Bacillariophyta*: Kramer & Lange-Bertalot (1986, 1988, 1991a, 1991b).

RESULTS AND DISCUSSION

The results of our investigation are presented in Table 1. Determined species (104 species) belongs to 5 divisions: Bacillariophyta 64 taxa (61.53%), Chlorophyta 14 taxa (13.46%), followed by Cyanophyta and Euglenophyta with 12 taxa (11.53 %) and Xanthophyta 2 taxa (1.92%).

The division Bacillariophyta contain 29 genus, followed by Cyanophyta with 8 genus, Euglenophyta and Chlorophyta by 3 genus and Xanthophyta by 2 genus.

The number of species per locality is different : in first locality determined 73 species, in second determined 56 , while at third locality is determined 70 species. As seen first and third locality has

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 5 :
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 (1.92%).
Bacillariophyta
 29 ,
 Cyanophyta 8 ,
 Euglenophyta Chlorophyta 3
 Xanthophyta 2 .
 :
 73 ,
 56 ,
 70 .

		- more number than second locality.
5	<i>Cyanophyta</i>	- Cyanophyta algae in the studied period were in subdominant community, they were registered in all studied parts of the lake. We determined 5 bioindicators species which belongs to Cyanophyta.
		- Diversity and productivity of diatoms vary from one rock type to another depending on the nature of the physical and chemical properties of the rock.
		- Large stones are expected to have stable communities, whilst small ones may be so moved during periods of high flow that the flora diversity and richness is reduced (Marker & Willoughby, 1988).
	(Marker & Willoughby, 1988).	
	Lobo et al. (2004)	
	<i>palea</i>	<i>N. palea</i>
		- Lobo et al. (2004) described <i>N. palea</i> as partially pollution tolerant. In this study, however, this species had high relative abundance in eutrophic sites 2.
	<i>N. palea</i>	<i>G. parvulum</i>
		- Many studies describe <i>N. palea</i> and <i>G. parvulum</i> as cosmopolitan, high pollution tolerant species, especially eutrophication and organic pollution (e.g. Lange-Bertalot, 1979; Kobayasi & Mayama, 1989; Tapia, 2008).
	(Lange-Bertalot, 1979; Kobayasi & Mayama, 1989; Tapia, 2008).	

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Table 1. Determined algae in waters of lake Radoniq during spring season 2013 year

		Level of saprobity	Localities		
			1	2	3
	t	40	73	56	70
104 Total number of species 104					
	/Division Cyanophyta				
1	Anabaena inequalis (Born. et Fla.)				1
2	Chroococcus cochaerens (Naeg.)		1		
3	Gloeocapsa montana (Kützing)				1
4	Nostoc linckia (Born et Flah.)		1		
5	Oscillatoria .formosa (Bory)		1		1
6	Oscillatoria mirabilis (Böcher)		1	3	
7	Phormidium ambigum (Gom.)				3
8	Ph.automnale (Ag.)Gom.	-	1		1
9	Ph. molle (Kützing)	-		1	
10	Ph.laminosum (Ag.) Gom		1	1	
11	Spirulina platensis (Nordst.)Geitl.		1		1
12	Stigonema hermioides (Kütz)Born et Fla.			1	
	Number of bioindicators species per locality	5	4	1	3
12	Cyanophyta Total number of species Cyanophyta and number of species per locality		7	5	6
63 species	/Division BACILLARIOPHYTA				
1	Achnantes hungarica(Gunow)	o	1		
2	A.ventralis(Krasske)Lange-Bertalot		1	1	
3	Amphora lybica (Ehrenberg)		1	1	3
4	Amphora normani (Rabenhorst)	o	1	1	
5	Cocconeis pediculus (Ehrenberg)	-	3	3	3
6	Cocconeis placentula (Ehrenberg)		3	1	5
7	C.placentula var. lineata(Ehrenberg)Cleve		3		
8	Craticula accomoda(Hustedt)Mann			1	1
9	Centronella reichelti(Voigt)		1		1
10	Cyclotella ocellata(Pantoseck)			1	
11	Cymatopleura solea (Brebisson)W.Smith	-	1	1	1
12	Cymbella affinis (Kützing)	-	3	3	3
13	C.helvetica (Kützing)			3	
14	C.naviculliformis(Auerswald)Cleve		3		3
15	Diatoma ehrenbergi Kützing			3	1
16	D.monoliforme (Kützing)		1	3	1
17	D.vulgaris (Bory)		3	3	3
18	Epithemia adnata (Kützing)		1		1
19	Fragilaria ulna(Nitzh.)Lange-Bertalot		1	3	1
20	F.ulna complex oxyrhynchus (Lange-Bert.)			1	
21	Frustulia vulgaris(Thwaites)DeToni		1		1

22	Gomphonema microporus (Kützing)			1	1
23	G.minutum (C.Agardh)		1	3	1
24	G.longiceps var.subclavatum (Grunow)		1		1
25	G.tenuae (Fricke)		1	1	
26	G.parvaulum var.exilissimum(Grunow)		1		
27	G.parvulum var.parvulus (Lange-Bertalot&Reichardt)			1	1
28	Gyrosigma acuminatum(Kützing)		1	1	1
29	G.scalpoides(Rabenhorst)Cleve		1	1	
30	G.attenuatum (Kützing)Rabenhorst		1		1
31	Hantzschia amphioxus(Ehrenberg)Grunow		1	1	1
32	H.elongata (Hantzch) Grunow				1
33	Hipodonta capitata(Ehrenberg)Lange-Bert.		1		1
34	Luticola geoppertiana(Bleish)Mann		1		1
35	Melosira varians (Agardh)		1		1
36	Meridion circulare(Agardh)		1	1	1
37	Navicula cryptotenella (Lange-Bertaolt)			3	3
38	Navicula lanceolata(Agardh)Ehrenberg		3	1	5
39	Navicula radiosa (Kützing)	-	3	3	
40	Navicula tripunctata(O.F.Müller)Bory			3	3
41	Navicula trivialis (Lange-Bertalot)		1		1
42	Navicula viridula (Kützing)Ehrenberg			3	3
43	N.viridula var.rostellata (Kützing)Cleve		3	1	
44	Nitzschia acula (Hantzsch In Rabenhorst)		3	1	3
45	N.capitellata (Hustedt)			3	3
46	N.constricta (Kützing)		3	3	3
47	N.dissipata(Kützing)Grunow	-	1		3
48	N.exilis (Kützing)			1	
49	N.palea (Kützing) W.Smith		1	3	1
50	Pinnularia microstauron(Ehren.)Cleve		1		1
51	P.microstauron var.brebissonii(Kützing)		3	3	3
52	Planothidium ellipticum(Cleve)Round				1
53	P.lanceolatum(Brebisson)Round		1		1
54	Reimera sinuata(Greg.)Kociolek&Stoemer		3		3
55	Rhoicosphenia abbreviata(Kützing)Grun		1		1
56	Sellaphora pupula (Kützing)		3		1
57	S.pupula fo. Rostrata(Hustedt)Bukhtiy.		1		1
58	Stauroneis smithi (Grunow)			1	1
59	Suirella angusta Kützing)		3		3
60	S.linearis (W.Smith)		1		
61	S.minuta (Brebisson in Kützing)		1	1	1
62	Synedra ulna(Nitzsch)Ehrenberg.		3	1	3
63	S.acus(Hustedt)		1	1	1
64	S.nana (Meister)		1		1
	Number of bioindicators species per locality	22	21	13	19
64	Bacillariophyta /Total number of species Bacillariophyta and number of species per locality		47	38	49
2 species	/Division XANTHOPHYTA				
1	Cryptomonas ovata (Ehrb.)		1	1	1
2	Ophiocytum gracillimum(Borz.)		1		1
	Number of bioindicators species per locality	0	0	0	0
2 species	XANTHOPHYTA Total number of species XANTHOPHYTA and number of species per locality		2	1	2

12	/Division EUGLENOPHYTA				
species					
1	Euglena viridis (Ehrenbeg)	-		1	
2	E.terricola (Dang.)Lemm		1		
3	E.oblonga (Schmitz.)			1	
4	E. intermedia (Klebs)Schmitz.	o-	1		1
5	E.pisciformis (Klebs)	-		1	
6	Phacus hispidulus Lemm.		1		
7	Trachelomonas.affinis Lemm.			1	1
8	T.euchlora (Lemm.)		1		1
9	T. hispida (Perty)Stein.			1	
10	T.oblonga Lemm.		1		1
11	T.perforata (Awerinz)			1	
12	T volvocina Ehrb.		1		1
	Number of bioindicators species per locality	6	3	3	3
12	Bacillariophyta		6	6	5
species	Total number of species Bacillariophyta and number of species per locality				
14	/Division CHLOROPHYTA				
species					
1	Cladophora fracta (Roth) Kütz		1		1
2	C.fracta var. lacustris (Roth) Kütz		1		
3	C glomerata (L) (Kütz)		1		1
4	Closterium archerianum Cleve		1		1
5	C attenuatum Ehreb.		1	1	
6	C.gracilis (Breb.)		1		1
7	C. moniliferum Nitzsch		1	1	
8	C.parvulum Naegeli				1
9	C.praelongum (Breb.)			1	
10	C.pseudolunula Borge.		1		1
11	C.striolatum Ehreb		1	1	
12	C.strigosum Breb.	-	1	1	1
13	C. venus Kütz			1	
14	Stigeoclonium tenue Kützing		1		1
	Number of bioindicators species per locality	7	5	3	5
14	Bacillariophyta		11	6	8
species	Total number of species Bacillariophyta and number of species per locality				
104	/Total number of species of algae and bioindicators species during spring season per locality	40	73	56	70
species					

CONCLUSIONS

(2013) - During the study period (spring season 2013) we identified 104 species of algae. Dominated the Bacillariophyta by 64 species, compared with other divisions. Determined 40 bioindicators

17 - species, dominated oligosaprob
- bioindicators species by 17
species.

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