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PERIPHYTIC ALGAL COMMUNITIES OF THE ŞTIUCII LAKE – NATURE RESERVE (CLUJ COUNTY, TRANSYLVANIA, ROMANIA)

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Abstract: Periphytic algal communities of the Ştiucii Lake – Nature Reserve (Cluj County, Transylvania, Romania). The Ştiucii Lake – Nature Reserve of the Romanian Academy, managed by the A.J.P.S. Cluj (Sport Fishing Association Cluj County) is mostly of zoologic character. The phytoplankton of the lake has repeatedly been investigated since 1960, but its periphyton was poorly documented. Based on seasonal samplings (spring, summer and autumn), carried out during the period 2001-2003, there have been identified 322 taxa belonging to the following phyla: Cyanoprokaryota (48 taxa), Euglenophyta (14 taxa), Dinophyta (3 taxa), Cryptophyta (6 taxa), Chrysophyta (2 taxa), Bacillariophyta (136 taxa), Xanthophyta (6 taxa), Chlorophyta – Chlorophyceae (87 taxa) and Zygnematophyceae (20 taxa). The present findings emphasized the high algal diversity of the most important Transylvanian dimictic freshwater lake that for the time being seems to be slightly influenced by human activity.

Introduction

The Ştiucii Lake is a natural waterbody situated at 274.5 m a.s.l. in Câmpia Transilvaniei (the Transylvanian Platou) – Câmpia Someşeană (the Someş River Platou) subdivision [7]. The lake is elongate in shape, located in the Bonţului Valley – a tributary of the Fizeşu Creek. The lake has four appendages (inlets) corresponding to four small tributaries situated in catchment area of the Bonţului Creek: – Vănăului Valley (Pârtoţului) and Sânăşele in the left side, and Arnitei and Săcălaia in ist right side [9]. Tectonic and melting of the saline bedrock are the main factors of its lowering [9]. The active transport of material from the drainage area (surrounding slopes), isolated the saline bottom from the lake water by an impervious silt deposit, that prevented the further dissolving of salt and the lake became fresh at last. However, the salt is present at the northern shore of the lake in the Săcălaia saline well (near the confluence of Săcălaia and Bonţului creeks) and on its east side near the A.J.P.S. fishing chalet [11].

According to recent measurements [11], the lake surface area decreases being only 57.35 ha, markedly less (68.7 ha) than that established [9] in 1957. Similarly, the depth is also decreased during this period from 12.7 m to 6.8 m [9, 11]. The main cause of these changes in the morphological parameters is the deposition of materials which silts the lake with an annual rate of 1.22 % of its total volume [10]. The silting affected the disappearances of the diversified bottom relief recorded previously [8], that became uniform and smooth [11].

The catchment area of the lake has 21.46 km^2, is delimited by hills with heights varying between 356 and 522 m and dominated by nutrient rich, calcareous brown soils.

The lake is surrounded by a thick wetland belt dominated by *Phragmites australis* and *Typha angustifolia* and extended over large areas uphill on the affluent valleys and downstream on the Bonţului Creek valley. This wetland retains and filtrates most of the allochtonous material washed off the slopes and therefore slows down the eutrophication of the lake pelagic zone. The slowing down process is achieved by both, simple physical and chemical processes (filtrating, melting, flocculating etc.) of the wetland vegetation and by metabolizing the nutrients by the higher plants and benthonic algae [12].

The term periphyton in its extended sense [3] was defined as a community complex of fixed or free living benthonic organisms, developing on submersed natural substrates (rocks, stones, sand, silt, submersed parts of plants, macroscopic algae), or on any other solid substrate present in the water (cables, pillars, boats, walls etc.). The periphyton has a complex structure consisting of primary producers (algae), consumers (protozoa, ciliates rotifers, small metazoan) and reducers (bacteria, fungi).

It should be mentioned that the algological studies carried out on the Ştiucii Lake have been focused on the phytoplankton [4, 5, and 6], except one [6] in which there were also listed 49 taxa (mostly diatoms), occurring in the epiphytic communities.

The purpose and aims of the investigations was to establish the species composition of the benthonic algal communities of the Ştiucii Lake, to make some preliminary quantitative estimation on their structure, as well as to reveal some aspects of their seasonal dynamics.

Material and Methods

Benthonic samples were collected seasonally (April, August, November) during three subsequent years (2001, 2002, 2003), from the surface of silt, sediments and of the stems of aquatic plants (living or partly decomposed remnants) on the east side of the lake, near the fishing chalet.

The samples were preserved in 4% formalin and investigated employing standard methods; the identification of taxa was performed according to the key books widely used in similar investigations.

The most important physical and chemical parameters were measured by using portable pH tester CONSORT P900 (temperature and pH), portable oxygen meter YSI 52 (dissolved oxygen and O_2 saturation %) and conductivity tester CONSORT K 911 (salinity and conductivity).

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Results and Discussions

The values of the physical and chemical parameters are given in table 1. Temperature and oxygen exhibit the normal seasonal variations characteristic for dimictic temperate lakes [1]. Lower the temperature, higher the dissolved oxygen and oxygen saturation (Table 1). The value of conductivity as measure of total dissolved substances indicates eutrophic conditions for the Ştiucii Lake. The conductivity was higher during spring and autumn circulation and mixing, when greater quantities of nutrients are drawn from bottom layers. Salinity and pH values denote alkaline fresh water conditions, correlated with the nature of substratum.

Table 1: Physical and chemical parameters of the Ştiucii Lake

Physical and chemical parameters of water	Date of sampling								
	2001			2002			2003		
	April	Aug.	Nov.	April	Aug.	Nov.	April	Aug.	Nov.
Temperature C^0	19.8	26.7	12.1	17.5	25	8	17.6	24.4	7.3
Oxygen $mg.l^{-1}$	6.99	7.81	8.6	7.4	7.46	11.6	7.1	7.89	8.21
Oxygen %	76.5	63.2	85.8	78.3	69.1	97.8	76.4	59.2	94.2
Conductivity $\mu S.cm^{-1}$	1235	1189	1327	1244	1136	1356	1182	1154	1315
Salinity $mg.l^{-1}$	655	635	704	664	520	628	630	615	645
pH	8.41	8.3	8.6	8.05	7.19	8.89	8.17	8.24	8.13

The floristic composition of benthic algal communities is given in table 2. The differences between epipelic and epiphytic communities (living plant or decomposing remnants) are merely quantitative. There were identified 322 taxa as follows: Cyanoprokaryota – 48 taxa (14.9%), Euglenophyta – 14 taxa (4.35%), Dinophyta – 3 taxa (0.93%), Cryptophyta – 6 taxa (1.86%), Bacillariophyta – 136 taxa (42.24%), Xanthophyta – 6 taxa (1.86%), Chlorophyta – Chlorophyceae – 87 taxa (27.02%) and Chlorophyta – Zygnematophyceae – 20 taxa (6.2%).

Table 2: Floristic composition of the periphyton in the Ştiucii Lake, Transylvania

TAXA		Date of sampling								
		2001			2002			2003		
		04	08	11	04	08	11	04	08	11
		1	2	3	4	5	6	7	8	9
CYANOPROKARYOTA										
1	Aphanizomenon flos-aquae		+			+				
2	Aphanothece clathrata								+	
3	Calothrix parietina			+						
4	Chamaesiphon confervicola		+	+						
5	C. minutus				+					
6	Gloeocapsa cohaerens		+							
7	G. limnetica		+	+		+	+			
8	G. minuta		+	+		+				
9	G. turgida	+						+	+	
10	Gloeothece limnetica	+								
11	G. rupestris	+								
12	Gomphosphaeria aponina								+	
13	G. compacta		+	+			+	+	+	
14	G. fusca				+					
15	G. lacustris	+	+	+	+	+		+		
16	G. naegeliana								+	
17	Lyngbya aestuarii					+				
18	L. kuetzingii			+						
19	Merismopedia elegans					+			+	
20	M. punctata		+							
21	Microcystis pulverea	+	+	+	+	+	+	+	+	+
22	Nostoc coeruleum							+		
23	Oscillatoria amphibia		+	+		+	+		+	+
24	O. boryana					+	+		+	+
25	O. brevis								+	
26	O. chalybea									+
27	O. chlorina								+	+
28	O. formosa		+							
29	O. geminata					+	+		+	+
30	O. granulata		+							
31	O. irrigua	+								
32	O. lacustris		+	+		+	+		+	
33	O. limosa	+	+	+	+	+	+	+	+	+
34	O. mougeotii		+	+		+				
35	O. planctonica		+		+	+	+		+	
36	O. pseudogeminata							+		
37	O. putrida		+			+			+	
38	O. sancta	+	+	+		+				
39	O. splendida					+				
40	O. tenuis	+	+	+						
41	Phormidium ambiguum		+							
42	Ph. uncinatum				+					
43	Pseudoanabaena catenata						+			
44	Scytonema hofmanni		+							
45	Spirulina major	+	+	+	+	+	+	+	+	+

46	Synechococcus elongatus								+	
47	Synechocystis aquatilis		+	+		+	+		+	+
48	Tolypothrix tenuis					+				
	EUGLENOPHYTA									
49	Cryptoglena pigra		+							
50	Entosiphon sulcatum		+							
51	Euglena acus		+			+	+		+	
52	E. gracilis		+			+	+		+	
53	E. velata					+				
54	Lepocinclis ovum								+	
55	L. texta		+			+			+	
56	Peranema trichophorum					+	+			
57	Petalomonas angusta							+		+
58	Phacus aenigmaticus		+			+			+	
59	Ph. nordstedtii		+			+			+	
60	Ph. orbicularis		+			+	+		+	
61	Ph. platalea		+			+				
62	Trachelomonas reinhardtii		+	+		+			+	+
	DINOPHYTA									
63	Ceratium hirundinella		+	+		+	+		+	+
64	Peridinium aciculiferum		+	+		+	+		+	+
65	P. cinctum		+	+		+	+		+	+
	CRYPTOPHYTA									
66	Chroomonas acuta	+		+	+		+	+		+
67	Cryptomonas curvata	+	+	+	+		+	+		
68	C. marssonii	+		+	+		+	+		+
69	C. obovata	+			+			+		
70	C. reflexa			+						+
71	Rhodomonas lacustris	+		+	+		+	+		+
	CHRYSOPHYTA									
72	Dinobryon cylindricum		+			+	+		+	
73	D. sertularia	+	+			+				
	BACILLARIOPHYTA									
74	Achnanthes affinis									+
75	A. andicola	+								
76	A. bioretii									+
77	A. conspicua									+
78	A. delicatula				+			+	+	
79	A. gibberula	+								
80	A. holsatica									+
81	A. hungarica				+			+		
82	A. lanceolata									+
83	A. microcephala									+
84	Achnanthidium minutissimum	+	+	+	+	+	+	+	+	+
85	Amphipleura pellucida	+	+	+	+	+	+	+	+	+
86	Amphora ovalis	+		+	+		+	+		+
87	A. pediculus	+		+	+		+	+		+
88	A. veneta	+		+	+		+	+		+
89	Anomoeoneis sphaerophora	+	+	+			+	+		+
90	A. vitrea									+
91	Asterionella formosa	+	+	+	+	+	+	+	+	+
92	Bacillaria paradoxa		+	+			+	+	+	+
93	Caloneis amphisbaena							+		+
94	C. silicula						+	+	+	+
95	Cocconeis pediculus	+	+	+		+	+	+	+	+
96	C. placentula	+	+	+	+	+	+	+	+	+
97	Cyclotella comensis	+								
98	C. comta	+		+	+			+		

99	C. meneghiniana	+	+	+	+			+	+	+
100	C. ocellata	+	+	+	+	+	+	+	+	+
101	Cymatopleura solea	+								
102	Cymbella affinis			+			+	+	+	+
103	C. amphicephala	+	+	+			+	+	+	+
104	C. aspera	+			+	+	+	+		
105	C. caespitosa			+			+			
106	C. cistula	+	+	+	+	+	+	+	+	+
107	C. cuspidata	+								
108	C. cymbiformis	+		+	+					+
109	C. laevis		+							
110	C. lanceolata	+	+	+	+	+	+	+		+
111	C. leptoceros	+	+	+	+	+	+	+	+	+
112	C. microcephala		+			+		+	+	
113	C. minuta		+	+	+	+	+	+		+
114	C. parva	+		+	+		+			
115	C. silesiaca	+		+						
116	C. simoensenii					+	+			
117	C. sinuata							+		+
118	C. tumida	+	+	+	+	+	+			
119	C. tumidula				+	+				+
120	C. turgida				+	+	+			
121	C. ventricosa									+
122	Diatoma elongatum		+	+						
123	D. tenuis							+		+
124	Epithemia argus				+					
125	E. turgida	+	+	+		+	+	+	+	+
126	E. zebra	+	+	+						
127	Fragilaria acus	+	+	+	+	+	+	+	+	+
128	F. biceps							+	+	+
129	F. capitata				+	+	+			
130	F. capucina	+	+	+		+	+	+	+	
131	F. construens f. subsalina							+		
132	F. crotonensis	+	+	+			+	+	+	
133	F. pinnata						+			
134	F. pulchella						+			
135	F. rumpens					+	+			
136	F. tabulata									+
137	F. ulna	+	+	+	+	+	+	+	+	+
138	F. vaucheriae							+		+
139	Frustulia vulgaris						+	+		
140	Gomphonema acuminatum	+	+	+		+	+	+	+	+
141	G. angustatum				+	+				
142	G. augur	+		+						
143	G. gracile	+	+	+	+	+			+	+
144	G. grovei var. lingulatum				+	+				
145	G. intricatum				+	+	+			
146	G. longiceps						+			
147	G. olivaceum				+	+				
148	G. parvulum	+	+	+	+	+	+	+	+	+
149	G. truncatum	+	+	+	+	+	+	+	+	+
150	G. subsalina								+	+
151	Hantzschia amphioxys	+								
152	Mastogloea elliptica	+	+	+	+	+	+	+	+	+
153	M. smithii	+	+	+	+	+	+	+	+	+
154	Navicula acomoda				+	+	+	+		
155	N. arvensis				+	+			+	
156	N. atomus						+			

157	N. capitata	+	+	+	+	+		+	+	+
158	N. cari					+				
159	N. cincta	+	+	+	+	+	+	+	+	+
160	N. cryptocephala	+	+		+	+	+	+		
161	N. cuspidata	+				+	+	+	+	+
162	N. exigua						+			
163	N. festiva				+	+				
164	N. gregaria							+	+	+
165	N. halophila	+	+	+	+	+	+	+	+	+
166	N. halophiloides	+	+	+	+	+	+	+	+	+
167	N. hasta						+			
168	N. heimansii				+	+				
169	N. hungarica	+			+	+		+	+	+
170	N. integra							+	+	
171	N. lanceolata	+	+	+	+	+	+	+	+	+
172	N. menisculus	+		+						
173	N. minima		+							
174	N. mutica							+	+	+
175	N. oblonga	+	+	+	+	+	+	+	+	+
176	N. peliculosa							+		
177	N. peregrina							+	+	+
178	N. protracta	+		+						
179	N. pseudotuscula				+					
180	N. pupula							+		
181	N. pygmaea		+	+	+	+		+		
182	N. radiosa	+	+	+	+	+	+	+	+	+
183	N. reinhardtii									+
184	N. rhynchocephala	+			+	+			+	
185	N. salinarum	+	+	+	+	+	+	+	+	+
186	N. spicula									+
187	N. tenelloides							+		
188	N. tripunctata	+		+	+	+		+	+	+
189	N. tuscula	+	+	+						
190	N. veneta							+		
191	N. viridula							+		
192	Nitzschia acicularis	+		+						
193	N. amphibia						+		+	
194	N. denticula	+		+						
195	N. dissipata							+	+	+
196	N. gracilis			+						
197	N. hungarica	+		+						
198	N. intermedia						+			
199	N. linearis	+			+	+		+	+	+
200	N. palea	+	+	+	+	+	+	+	+	+
201	N. sociabilis	+			+					
202	N. spectabilis						+			
203	N. tryblionella	+		+	+			+		+
204	Pinnularia borealis	+			+					
205	Rhoicosphaenia abbreviata	+	+	+	+	+		+	+	
206	Rhopalodia gibba	+	+	+	+	+	+	+	+	+
207	R. turgida	+	+	+	+	+	+	+	+	+
208	Surirella angusta							+		
209	Tabellaria flocculosa	+								
	XANTHOPHYTA									
210	Characium angustum		+			+				
211	Goniochloris mutica		+			+	+		+	
212	Ophiocytium capitatum								+	
213	O. cochleare		+			+			+	

214	O. parvulum		+			+			+	
215	Pleurochloris anomala	+			+			+		
	CHLOROPHYTA – CHLOROPHYCEAE									
216	Actinochloris sphaerica		+							
217	Ankistrodesmus densus		+							
218	A. falcatus		+							
219	A. fusiformis		+			+				
220	Botryococcus braunii	+	+		+	+	+		+	
221	Characiopsis borziana					+				
222	Chlamydomonas metapyrenigera		+							
223	Chlamydonephris pomiformis						+			
224	Chlorella vulgaris		+			+				
225	Chlorobion braunii		+							
226	Chlorococcum schizochlamys		+	+		+			+	+
227	Chloronephris pigra			+						
228	Cladophora glomerata	+	+	+	+	+	+	+	+	+
229	Coccomonas orbicularis		+							
230	Coelastrum astroideum							+	+	+
231	C. microporum	+	+	+	+		+			
232	C. pseudomicroporum			+		+			+	
233	C. sphaericum									+
234	Coenochloris pyrenoidosa		+						+	
235	Crucigenia fenestrata	+	+	+						
236	C. quadrata			+						
237	C. tetrapedia	+		+	+	+	+		+	+
238	Crucigeniella rectangularis									+
239	Dictyosphaerium pulchellum		+			+	+		+	
240	Didymocystis planctonica		+							
241	Dimorphococcus variabilis		+							
242	Elakatothrix lacustris			+						
243	E. planctonica		+						+	
244	Fusola viridis					+				
245	Kirchneriella contorta			+		+			+	
246	K. irregularis	+	+			+			+	+
247	K. lunaris	+	+						+	+
248	K. obesa	+		+		+			+	
249	K. subcapitata	+				+			+	
250	Koliella setiformis							+	+	
251	Lagerheimia ciliata		+			+			+	
252	L. citriformis		+			+			+	
253	L. genevensis		+	+		+	+		+	+
254	Monoraphidium arcuatum									+
255	M. contortum	+	+			+	+		+	
256	M. flexuosum	+	+			+			+	
257	M. griffithii		+			+			+	
258	M. irregulare		+							
259	M. lunatum			+		+				
260	M. obtusum			+		+				
261	M. pusilum					+				
262	M. tortile								+	
263	Oocystis borgei					+				
264	O. lacustris	+	+	+		+	+		+	
265	O. marssonii		+	+		+			+	+
266	O. parva								+	+
267	O. solitaria					+			+	
268	O. submarina	+	+			+				
269	Pandorina morum						+			
270	Pediastrum boryanum		+	+		+	+		+	+

271	P. tetras	+	+		+				+	+
272	Protoderma viride	+								
273	Pteromonas aequiciliata						+			
274	Radiococcus nimbatus		+			+			+	
275	Scenedesmus acutus		+	+		+	+		+	+
276	S. arcuatus	+	+	+	+	+	+	+	+	+
277	S. bicaudatus		+	+		+	+		+	+
278	S. brevispina		+			+				
279	S. disciformis		+	+						+
280	S. dispar		+			+			+	+
281	S. ecornis	+	+	+	+	+	+	+	+	+
282	S. intermedius	+	+		+	+			+	
283	S. linearis	+	+		+	+			+	
284	S. quadricauda	+	+			+	+		+	+
285	S. quadrispina		+			+			+	+
286	S. spinosus		+	+		+	+		+	+
287	Sphaerellopsis fluviatilis			+		+	+		+	
288	Sphaerocystis schroeterii		+		+	+			+	+
289	Stichococcus bacillaris	+				+	+		+	
290	S. minor	+	+			+		+	+	
291	S. mirabilis			+		+	+		+	
292	Tetraëdron enorme						+			
293	T. incus								+	
294	T. minimum	+	+	+	+	+	+	+	+	+
295	T. glabrum			+	+	+				+
296	T. punctulatum			+		+		+	+	
297	T. staurogeniaeforme		+			+			+	
298	T. triangulare	+	+	+	+	+	+	+	+	
299	Treubaria planctonica		+			+			+	
300	T. triappendiculata	+	+			+		+	+	
301	Trochiscia planctonica							+		
302	Willea irregularis				+					
CHLOROPHYTA - ZYGNEMATOPHYCEAE										
303	Closterium dianae	+			+		+	+		
304	C. ehrenbergii								+	+
305	C. leibleinii	+	+		+	+		+	+	
306	C. pronum	+	+							
307	C. tumidulum	+	+			+		+	+	
308	Cosmarium abreviatum	+		+	+	+			+	+
309	C. botrytis	+	+	+	+	+		+		+
310	C. formosulum				+					
311	C. impressulum	+	+			+			+	
312	C. praemorsum		+			+				
313	C. pseudocoronatum				+	+				
314	C. polygonatum		+	+		+			+	+
315	C. pygmaeum	+	+		+				+	+
316	C. reniforme				+			+		
317	C. subtumidum			+	+			+		
318	C. tumidum		+			+			+	
319	C.tenue								+	+
320	C. tinctorum								+	+
321	Staurastrum paradoxum		+	+		+	+		+	+
322	S. tetracerum		+	+		+	+		+	+

According to the present findings the diatoms exhibit the highest diversity (136 taxa) representing more than 42% of the total taxa, the green algae, mostly clorococcalean, occupy the second place (27%), the blue-greens (15%) being less numerous. As concerning seasonal changes in community structure they fit into the pattern of temperate lakes [3]. There is a maximum growth and diversity of diatoms in spring, followed by a relative decline during summer and a second peak in fall. The green algae have their maximum in summer, like blue-greens and euglenoid flagellates, but with lower values. The number of taxa varies between 200 and 215 per year that means 2/3 of the total identified algae, suggesting a longer term dynamics. There are several species that occurred only in 2001 (*Lyngbya kuetzingii, Scytonema hofmanii, Entomosiphon sulcatum, Achnanthes gibberula, Navicula minima, Tabellaria flocculosa, Chlorobion braunii, Crucigenia quadrata* etc.), or in 2002 (*Chamaesiphon minutus, Lyngbya aestuarii, Phormidium uncinatum, Pseudoanabaena catenata, Navicula atomus, N. cari, N. hasta, N. pseudotuscula, Fusola viridis, Pteromonas aequiciliata, Cosmarium formosulum* etc.) or exclusively in 2003 (*Apahnothece clathrata, Gomphosphaeria aponina, Nostoc coeruleum, Oscillatoria brevis, O. pseudogeminata, Tolypothryx tenuis, Lepocinclis ovum, Achnanthes affinis, A. holsatica, A. microcephala, Anomoeoneis vitrea, Cyclotella comta, Fragilaria construens* f. *salina, F. tabulata, Navicula tenelloides, Surirella angusta, Monoraphidium tortile, M. arcuatum, Tetraëdron incus, Trochiscia planctonica* etc.). Some of these are usual members of the plankton community and are accidentally washed into the littoral periphyton (*Aphanothece clathrata, Gomphosphaeria aponina, Lepocinclis ovum, Cyclotella comta, Trochiscia planctonica*) others are edaphic elements (*Navicula atomus, Nostoc coeruleus*) or coenoxenic ones drained into the lake from the neighboring ecosystems of the catchment area (*Tabellaria flocculosa, Anomoeoneis vitrea*).

As concerning the species composition of the flora, one should note that most taxa are cosmopolitan, widespread in similar lentic or even lotic ecosystems (most diatoms, some *Chamaesiphon, Oscillatoria, Lyngbya, Monoraphidium, Scenedesmus*, and *Pediastrum* species). As usual for periphyton, most algae occurring in its communities are benthonic forms, attached to the substrate (*Oscillatoria, Lyngbya, Phormidium, Fragilaria, Cymbella*), but there are also present free living elements, like *Merismopedia, Gloeothece, Gloeocapsa, Synechocystis, Achnanthes, Navicula, Kirchneriella, Cosmarium, Closterium* etc. The epiphytic elements dominate quantitatively the periphyton (*Cocconeis placentula, C. pediculus, Characium angustum, Characiopsis borziana, Epithemia* and *Rhopalodia* species), but there are present many algae usually occurring in the metaphyton (*Spirulina major, Botryococcus braunii*, some species of *Phacus, Ophiocytium, Chlorella, Oocystis, Scenedesmus, Crucigenia, Stichococcus* and *Tetraëdron*. There are present in the periphyton many true plankton forms, characteristic for the pelagic zone of lakes or living in shallow lentic habitats (*Gomphosphaeria, Microcystis, Aphanizomenon, Euglena, Lepocinclis, Trachelomonas, Ceratium, Peridinium, Cryptomonas, Dinobryon, Scenedesmus, Pediastrum, Coelastrum, Dictyosphaerium, Lagerheimia, Monoraphidium, Sphaerocystis* etc.).

The periphyton of the Ştiucii Lake is dominated by eutrophic basophilic elements, in accordance with the physical and chemical properties of the lake water (Tab. 1). The nature of bedrock justifies the presence of some halophilous algae, like *Cyclotella meneghiniana, Synechococcus elongatus, Fragilaria tabulata, Gomphonema subsalina, Mastogloea elliptica, M. smithii, Navicula halophila, N. cuspidata, N. halophiloides, N. hungarica, N. pygmaea, Nitzshia tryblionella* etc. The anoxic conditions of the lake sediment [2], support the occurrence of H_2S indicator blue-greens like *Oscillatoria geminata* and *O. putrida*.

As concerning the saprobity of the Ştiucii Lake, most periphytic algae are o-β-mesosaprobic indicators. The presence of a few α- mesosaprobic or even polysaprobic algae (*Oscillatoria putrida, Cosmarium botrytis, Cyclotella maneghiniana, Navicula accomoda, N. cryptocephala* etc.), is possibly due to human activities (sport fishing, tourism, waste waters of the chalet etc.).

The diatoms dominate not only qualitatively, but also quantitatively the periphyton of the Ştiucii Lake during the investigated years. The seasonal variations are given by changes in the proportion of the same dominant genera (Fig. 1).

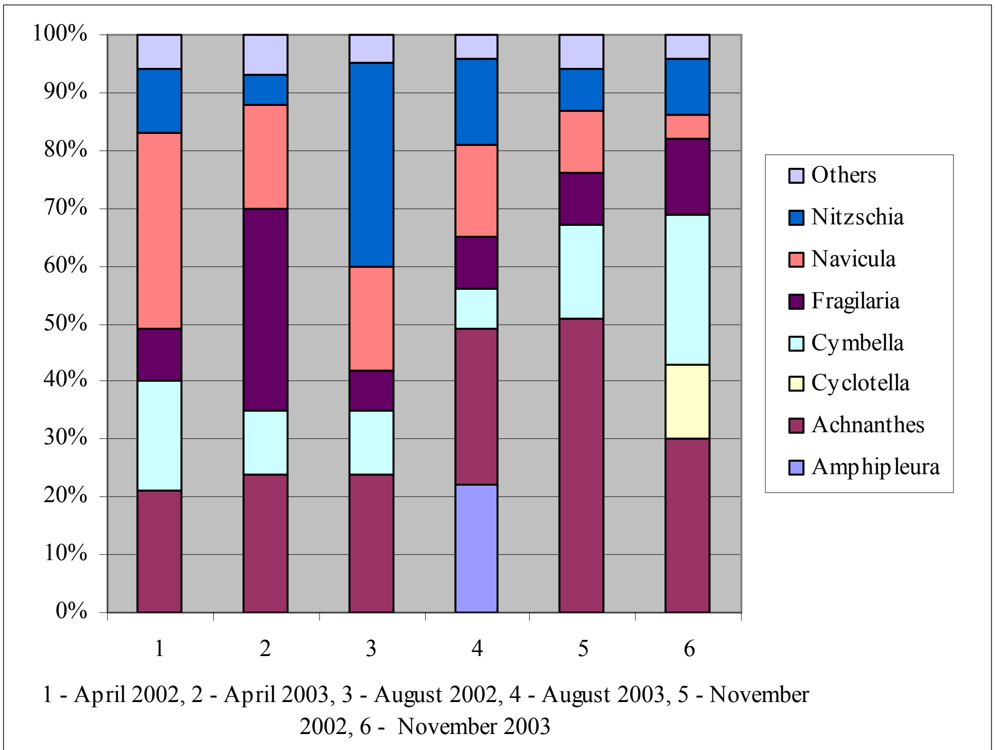

Fig. 1: Quantitative structure of the epiphytic algal communities in the Ştiucii Lake based on the most abundant diatom genera.

Conclusions

The present paper is an important contribution to the investigation of the periphyton in natural lakes in Romania, especially of the Ştiucii Lake which has not yet been searched for its benthonic communities.

The pattern of periphyton in the Ştiucii Lake is given by the occurrence of eutrophic, basophilic elements accordingly to the water physical and chemical parameters.

The nature of bedrock (saline) justifies the presence of some halophilous algae.

The Ştiucii Lake is well preserved and managed as Nature Reserve and recreation area, bird watching and sport fishing. Although, human impact especially eutrophication is less evident as reflected in the composition of the algal flora, future attention in lake management and algal monitoring would be necessary.

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COMUNITĂŢILE ALGALE PERIFITICE DIN REZERVAŢIA NATURALĂ LACUL ŞTIUCII (JUD. CLUJ), TRANSILVANIA, ROMÂNIA

(Rezumat)

Lacul Ştiucii, cel mai autentic lac natural de tip dimictic din Câmpia Transilvaniei este situat la o altitudine de 274,5 m, în albia Văii Bonţului, un afluent al Fizeşului. Lacul a luat naştere prin dizolvare şi tasare-prăbuşire pe cutele diapire situate pe aliniamentul Dej – Săcălaia – Sic – Cojocna – Turda – Ocna Mureş. Prin transportul activ de material de pe versanţi, sarea de la bază a fost izolată de apă printr-un strat etanş de mâl, ca urmare cu timpul apa s-a îndulcit. În ultimile decenii suprafaţa lacului s-a restrâns la 57,35 ha, adâncimea a scăzut la 6,8 m [11], datorită colmatării lacului care evoluează cu un ritm anual de 1,22 % din volumul total [10]. Lacul este înconjurat de o fâşie lată de zonă umedă edificată de trestie şi papură, care filtrează şi reţine materialul alohton şi nutrienţii antrenaţi de pe versanţi şi întârzie procesul de eutrofizare a lacului.

Cercetările efectuate asupra algelor din Lacul Ştiucii s-au rezumat până în prezent aproape exclusiv asupra fitoplanctonului [2, 5 6]. Totuşi, în lucrarea publicată în 1960 [6] sunt enumerate 49 taxoni de microalge, în majoritate diatomee, identificate din eşantioane epifitice. Lucrarea de faţă abordează în premieră studiul perifitonului (comunităţile epipelice, epifitice), deosebit de bogat şi dezvoltat, după cum reiese din lista prezentată care cuprinde 322 taxoni, repartizaţi la următoarele încrengături: *Cyanoprokaryota* (48), *Euglenophyta* (14), *Dinophyta* (3), *Cryptophyta* (6), *Chrysophyta* (2), *Bacillariophyta* (136), *Xanthophyta* (6), *Chlorophyta – Chlorophyceae* (87) şi *Zygnematophyceae* (20). Observaţiile preliminare asupra aspectelor sezoniere arată că asistăm la dominarea calitativă şi cantitatică a diatomeelor în perifiton, care după un scurt declin de vară formează un al doilea maxim toamna. În sezonul de vară, pe lângă diatomee devin mai importante şi algele verzi, cele albastre-verzi, respectiv flagelatele euglenoide. Majoritatea speciilor identificate sunt larg răspândite în ape stătătoare, preferenţial eutrofe bazifile, pe lângă care apar şi câteva elemente halofile.

Lacul Ştiucii, Rezervaţie Naturală cu caracter zoologic, administrat de AJPS Cluj, este o zonă de agrement amenajat pentru pescuit sportiv, deci supus unui impact antropic ocazional, astfel încât necesită o atenţie şi supraveghere permanentă.