Contribuţii Botanice, XLI, (1), **2006**
Grădina Botanică "Alexandru Borza"
Cluj-Napoca

STRUCTURE OF PHYTOPLANKTON COMMUNITIES FROM THE PONDS OF "ÎNTRE LACURI" QUARTER, CLUJ-NAPOCA (TRANSYLVANIA, ROMANIA)

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Abstract: Structure of phytoplankton communities from the ponds of "Între Lacuri" quarter, Cluj-Napoca (Transylvania, Romania). The species composition of planktonic algal communities were studied based on the samples collected in 2004 and 2005. The algal flora exhibits a high species diversity consisting of 331 taxa identified in 3 ponds. The dominant groups were reprezented by green algae *(Chlorophyta)* and diatoms *(Bacillariophyta)* - 37.16%, followed by cyanobacteria *(Cyanoprokaryota)* - 14.8%. The contribution of *Euglenophyta*, *Dinophyta*, *Xanthophyta*, *Cryptophyta* and *Chrysophyta* was less than 7%.

According to the number of eutrophic indicator species and the values of the trophic indices, the water of the 3 ponds is eutrophic. The values of the Organic Pollution index indicates heavy organic pollutin for Ponds 1 and 2, and moderate pollution for Pond 3.

Key words: phytoplankton, integrated composite sampling, trophic indices, Organic Pollution Index

Introduction

Phytoplankton, together with benthic algae and macrophytes, constitute the autochtonous primary producers in aquatic ecosystems and, as such, is part of the basis of the food web in terms of energy and material input. To understand the biological functioning of individual rivers, lakes and reservoirs, and to detect changes in them, it is essential to investigate the development of their phytoplankton population. Due to their short life cycle, planktonic algae respond quickly to environmental changes and are thus a valuable indicator of water quality [4].

The "Între Lacuri" quarter situated in the eastern part of the Cluj-Napoca city shelters 3 ponds: Pond 1 is arranged for entertainment, Pond 2 is in advanced state of degradation and in the warm season the surface of its water is covered with a thick layer of *Lemna minor*. Pond 3 is less affected by human activity and in the littoral zone has a well developed paludal vegetation consisting especially of *Phragmites australis*.

The aim of this study was to establish the species composition of the phytoplankton communities, to evaluate the trophic level of the ponds, as well as to assess the water quality.

Materials and Methods

Phytoplankton samples were collected monthly between March 2004 and December 2005 by using integrated composite sampling [2]. The phytoplankton samples filtered through a planktonic net with mesh size of 20 μm were, preserved in 4% formalin and investigated by employing standard methods; the identification of taxa was performed according to the key books widely used in similar investigations [2, 5, 6, 7, 9, 10, 11, 12]. Samples have only been assessed from qualitative point of wiew.

To estimate the water quality we used the Index of Organic Pollution (Palmer) [8]. For the evaluation of the trophic status we calculated 3 more indices: Trophic Index elaborated by Heinonen [3], Chlorophycean Index (Thunmark) and Compound Index (Nygaard) [15].

Results and Discussions

Some morphometrical and physico-chemical parameters of the ponds are given in table 1. pH values indicate alkaline waters. Salinity and conductivity values were higher in Pond 2.

Table 1: Morphometrical and physico-chemical data

Morphometrical and physico-chemical data	Pond 1	Pond 2	Pond 3
Pond area (m^2)	53 120	52 642	
Maximum depth (m)	2	1	1.75
pH	7.68	7.65	7.98
Salinity (mg/l)	0.2	0.5	0.2
Conductivity (μS/cm)	907	1547	887

There were identified 331 taxa (Tab. 2), which belong to the following algal divisions: *Cyanoprokaryota* – 49 taxa (14.8%), *Chrysophyta* – 2 taxa (0.6%), *Xanthophyta* – 3 taxa (0.9%), *Cryptophyta* – 3 taxa (0.9%), *Bacillariophyta* – 123 taxa (37.16%), *Chlorophyta* – 123 taxa (37.16%), *Euglenophyta* – 20 taxa (6.04%) and *Dinophyta* – 8 taxa (2.41%).

Most of the identified species are cosmopolitan and highly tolerant in the same time. Such species are *Chroococcus minutus, Peridinium umbonatum, Achnanthes minutissima, Scenedesmus quadricauda, S. acutus, Pediastrum boryanum, P. tetras, Tetraëdron minimum, Monoraphidium contortum, Oocystis marssonii* and *Euglena acus.* Beside the indiferent forms there were found many eutrophic elements (*Microcystis aeruginosa, M. viridis, Oscillatoria planctonica, Pandorina morum Lagerheimia genevensis, Coelastrum reticulatum, Aulacoseira granulata, Cyclotella meneghiniana*).

The values of the trophic indices indicate eutrophic waters in all 3 ponds. According to the Organic Pollution Index Pond 1 and 2 are heavy polluted, while Pond 3 contains a moderate organic loading (Table 3).

Table 3: Trophic indices and Organic Pollution Index

Indices	**Pond 1**	**Pond 2**	**Pond 3**
Trophic Index	28 eutrophic	30 eutrophic	26 eutrophic
Compound Index	9,66 eutrophic	27 eutrophic	2,84 eutrophic
Chlorophycean Index	5,07 eutrophic	10 eutrophic	4,38 eutrophic
Organic pollution Index	26 Heavy organic pollution	25 Heavy organic pollution	16 Moderate organic pollution

Table 2: Qualitative structure of planktonic algal communities inhabiting the ponds of Între Lacuri quarter, Cluj-Napoca

	Pond 1																								Pond 2																		Pond 3																	
	2004								2005																2004												2005																		2004												2005																	
Taxa	III	V	VI	VII	VII	IX	X	XI	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Cyanophyta																																																											
Anabaena circinalis																																																										
A. constricta																								+	+	+								+	+																								
Aphanizomenon flos-aquae															+								+	+	+			+	+			+	+																								
Aphanocapsa conferta			+	+														+															+	+	+	+			+	+	+	+																
A. delicatissima						+	+	+	+		+	+			+							+		+	+	+	+	+	+	+	+	+	+	+	+																								
A. holsatica															+	+	+	+	+	+				+	+																																				
A. incerta			+								+		+		+		+	+				+	+	+	+	+		+							+	+	+	+	+	+																		
Aphanothece clathrata															+																																													
Bacularia vermicularis																										+																																		
Chroococcus minutus							+	+																														+	+								+												
Coelosphaeriopsis chlamidocystis																										+	+	+	+		+			+																								
Gomphosphaeria aponina																			+																																								
Lyngbya confervoides																													+																														
L. hieronymusii																						+	+													+	+																						
Merismopedia glauca																										+	+																																
M. tenuissima													+											+	+	+																																
M. warmingiana										+													+																																				
Microcystis aeruginosa		+	+	+	+	+	+	+	+				+	+	+	+	+	+	+	+	+		+	+	+	+											+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
M. flos-aquae															+																																												
M. viridis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
M. wesnbergii	+	+	+	+	+	+	+	+			+											+	+	+	+												+	+	+	+	+	+	+		+		+	+						+				
Oscillatoria acutissima																																																										
O. amphibia	+		+	+	+		+				+	+			+			+				+	+	+	+	+	+	+	+	+	+						+	+			+	+	+	+	+	+				+	+			+	
O. amphigranulata														+										+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
O. brevis																										+																																	
O. chalybea																															+																												
O. deflexoides													+				+	+										+																																
O. formosa				+																		+	+																																					
O. geminata													+																																																	+	
O. guttulata	+	+	+				+		+	+	+								+												+																										
O. irrigua																															+			+	+																								
O. limnetica						+		+		+	+																																																		
O. major																																	+																												
O. minima	+		+	+																																																									

Taxa	III	V	VI	VII	VII	IX	X	XI	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
O. planctonica	+		+	+			+	+				+	+	+	+	+	+		+		
O. princeps																					
O. prolifica																					
O. putrida																					
O. quasiperforata																					
O. rupicola																					
O. setigera	+		+	+	+		+				+	+	+	+	+	+	+	+	+		
O. simpicissima																					
O. tenuis															+						
Phormidium fragile																					
P. mucicola		+	+	+	+	+	+	+	+				+	+	+	+	+	+	+		
P. subcapitatum																					
Spiruluina major																					
Woronichinia compacta															+	+	+				
W. naegeliana	+	+	+									+	+	+	+	+	+	+	+		
Chrysophyta																					
Dinobryon divergens														+		+		+	+	+	
D. setularia																					
Xanthophyta																					
Acanthochloris scherffelii					+											+					
Goniochloris mutica		+	+																		
Tetraplectron tribulus																					
Cryptophyta																					
Cryptomonas erosa																				+	
C. marssonii																	+				
Rhodomonas lacustris																+			+	+	
Bacillariophyta																					
Achnanthes impexa																+			+	+	
A. minutissima			+			+				+	+					+	+	+	+	+	+
A. lanceolata																+	+		+	+	
Actinocyclus normanii	+	+			+																
Amphora coffeaeformis																					
A. ovalis																					
A. pediculus																					
A. subcapitata																					
A. veneta																+	+				+

Taxa	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI
O. planctonica	+		+	+		+	+	+		+	+	+	+	
O. princeps														+
O. prolifica											+			
O. putrida														
O. quasiperforata														
O. rupicola			+	+			+		+			+		
O. setigera							+			+		+		+
O. simpicissima														
O. tenuis	+					+								
Phormidium fragile									+					
P. mucicola			+	+	+	+								+
P. subcapitatum					+									
Spiruluina major		+	+											
Woronichinia compacta														
W. naegeliana			+											+
Chrysophyta														
Dinobryon divergens										+	+			
D. setularia						+								
Xanthophyta														
Acanthochloris scherffelii														
Goniochloris mutica														
Tetraplectron tribulus														
Cryptophyta														
Cryptomonas erosa									+					
C. marssonii									+					
Rhodomonas lacustris														
Bacillariophyta														
Achnanthes impexa	+						+					+		
A. minutissima			+	+	+		+	+		+	+		+	+
A. lanceolata														
Actinocyclus normanii								+						
Amphora coffeaeformis			+	+	+	+	+						+	+
A. ovalis	+	+	+	+	+	+	+	+		+	+		+	+
A. pediculus						+								
A. subcapitata														
A. veneta														+

Taxa	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
O. planctonica					+	+	+	+					+	+	+		+	+	+	+
O. princeps																				
O. prolifica																				
O. putrida																				+
O. quasiperforata															+					
O. rupicola																				+
O. setigera			+	+	+							+	+	+	+	+	+	+	+	
O. simpicissima						+	+			+					+	+	+			
O. tenuis																	+			
Phormidium fragile																				
P. mucicola	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
P. subcapitatum																				
Spiruluina major							+													+
Woronichinia compacta														+	+	+				
W. naegeliana			+	+	+	+	+	+	+				+	+	+	+	+	+		
Chrysophyta																				
Dinobryon divergens															+				+	+
D. setularia																				
Xanthophyta																				
Acanthochloris scherffelii																				
Goniochloris mutica																				
Tetraplectron tribulus					+															
Cryptophyta																				
Cryptomonas erosa																				
C. marssonii																				
Rhodomonas lacustris												+	+							+
Bacillariophyta																				
Achnanthes impexa							+					+			+				+	
A. minutissima	+		+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
A. lanceolata																			+	+
Actinocyclus normanii										+	+		+							
Amphora coffeaeformis					+															
A. ovalis	+	+	+	+			+							+						
A. pediculus															+				+	
A. subcapitata						+	+	+												
A. veneta															+	+	+	+	+	+

Taxa	III	V	VI	VII	VII	IX	X	XI	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Anomoeoneis sphaerophora																											+				+	+		+	+	+	+	+		+	+	+														+	
Asterionella formosa														+							+										+	+																							+	+
Aulacoseira alpigena													+	+																																										
A. distans									+	+																																													
A. granulata	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				+		+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
A. granulata f. angistissima																+	+	+	+																																	+	+	+	+		
A. granulata f. curvata	+	+	+	+	+		+	+	+					+	+	+	+	+	+					+	+	+						+		+																						
A. muzzanensis	+	+	+	+	+										+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+		+																						
A. subarctica f. recta		+												+																																											
Caloneis silicula																					+																																							
Cocconeis pediculus					+									+		+	+	+	+	+	+			+	+	+						+	+																							
C. placentula		+			+		+									+	+																																								
Cyclotella bodanica var. affinis	+	+	+		+										+	+	+	+						+																																		
C. comta						+		+																																																	
C. fotti									+																																																
C. iris	+	+	+	+	+				+	+	+	+	+		+					+	+	+	+	+	+			+	+	+																										
C. meneghiniana	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	
C. ocellata		+					+									+																																								
C. planctonica									+	+	+								+																																							
Cymatopleura elliptica																																			+																							
C. solea							+							+							+	+	+										+																								
Cymbella affinis																+	+			+																																						
C. aspera																																																									
C. caespitosa														+							+																																					
C. cistula																+	+	+	+		+		+	+										+																								
C. excisa																				+																																						
C. lanceolata																																																									
C. microcephala																																																									
C. minuta			+			+		+								+	+				+																																					
C. pseudoaffinis																																																									
C. subaequalis																																																									
C. silesiaca																+	+				+																																					
Denticula kuetzingii																																																									
Diatoma tenuis																					+	+	+	+	+				+	+	+																										
D. vulgaris																																																									
Epithemia adnata						+		+		+	+													+																																		
E. argus	+	+																																																							
E. sorex					+																+		+																																			

Taxa	III	V	VI	VII	VII	IX	X	XI	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Eunotia serra																									+																														
Fragilaria capucina			+		+			+	+		+			+	+						+			+					+		+	+		+		+	+	+		+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
F. construens	+				+	+			+		+	+																																		+	+								
F. crotonensis																		+	+		+																					+	+											+	+
F. dilatata																						+	+					+								+	+	+	+	+		+	+			+	+	+		+	+	+	+	+	
F. pinnata var. pinnata			+	+																									+	+															+										
F. tenera		+		+							+	+	+						+	+	+																									+	+	+	+					+	
F. ulna	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+		+		+		+	+	+	+	+
F. ulna var. acus	+	+	+	+	+	+		+	+		+	+	+	+	+	+	+	+	+	+			+	+	+	+	+		+	+	+	+	+	+		+	+	+	+		+	+			+					+	+	+	+	+	+
Gomphonema acuminatum														+																										+		+	+												
G. angustatum																																				+									+										
G. gracile																								+				+	+						+	+	+					+	+						+						+
G. olivaceum																						+	+	+	+							+	+	+									+												+
G. parvulum									+		+						+	+	+	+					+	+	+	+	+	+	+	+		+	+																+	+	+	+	+
G. pseudoaugur						+	+																			+	+	+				+																							
G. truncatum	+	+	+	+			+			+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+	+		+	+				+	+	+	+	+	+	+							+	+
Gyrosigma nodiferum			+	+																									+				+	+	+		+	+	+	+	+	+	+						+						
G. spencerii		+						+						+	+						+		+	+			+					+		+											+	+	+	+			+	+			
Hantzschia amphyoxis							+																																																
Melosira lineata					+																						+							+						+									+						
M. nummuloides																																																			+				
M. varians																					+																																	+	+
Navicula capitata var. capitata	+	+	+		+	+	+														+				+		+	+				+		+	+							+												+	
N. capitatoradiata				+																						+																													
N. cryptocephala																						+	+	+	+		+	+					+	+								+	+				+								
N. cryptotenella																									+			+			+	+		+	+	+	+						+	+	+			+							
N. cuspidata		+												+							+	+	+								+	+				+	+					+	+			+	+	+						+	
N. halophila																								+	+	+		+				+			+																				
N. lanceolata																																							+						+										
N. menisculus																											+						+		+				+	+		+	+												
N. phyllepta																								+	+	+		+								+						+			+										
N. protracta																										+																													
N. pupula var. pupula																								+	+						+	+		+																					
N. radiosa																				+									+							+	+	+	+			+													
N. recens																																							+																
N. seminulum																								+	+	+	+	+	+		+	+		+																					
N. tripunctata																																																						+	
N. trivialis																										+																+						+							
N. veneta																										+	+	+	+			+		+																					

Taxa	III	V	VI	VII	VII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
N. viridula var. rostellata																+																																																	
Neidium affine																												+																																				
N. alpinum																													+																																			
N. ampliatum		+																											+																																			
Nitzschia acicularis		+	+												+					+	+							+																																			
N. angustata		+					+																																																											
N. amphibia																+	+	+	+	+					+	+	+	+	+																																			
N. brevissima																						+					+	+	+		+	+																																
N. capitellata																															+																																		
N. constricta																										+																																						
N. dissipata var. media		+																																																															
N. filiformis		+																																																																
N. flexoides																													+																																			
N. fonticola																																																																	
N. frustulum var. frustulum																																																																
N. graciliformis																																																																
N. gracilis																																																																
N. hungarica																																																																
N. levidensis																																																																
N. linearis var. linearis																						+	+																																									
N. normanii																																																																
N. palea			+		+								+		+					+					+	+	+	+	+	+																																
N. parvula																																																																
N. sigma																																																																
N. sigmoidea	+	+	+	+	+	+							+	+		+	+		+	+	+	+	+	+			+	+	+		+	+	+	+																														
N. sinuata var. tabellaria																+				+																																										
N. subacicularis	+												+	+																																																	
N. umbonata							+											+	+	+																																										
N. tryblionella																																																																
Pinnularia microstauron																																																														
P. subrostrata																																																															
P. viridis				+										+	+				+						+																																						
Rhoicosphenia abbreviata																	+	+			+																																									
Rhopalodia gibba var. gibba																																																													
Surirella brébissoni		+					+						+	+																																																
S. ovalis																																																															
Stauroneis tackei																																																													

Taxa	III	V	VI	VII	VII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Chlorophyta																																																										
Chlamydomonadales																																																										
Chlamydomonas metapyrenigera	+	+										+																																														
C. microsphaerella										+																																																		
Volvocales																																																											
Eudorina elegans								+	+					+						+																																									
Pandorina morum																																	+																												
Chlorococcales																																																											
Ankistrodesmus densus																																																											
A. spiralis																																																											
Ankyra ancora f. ancora																				+																																						
A. lanceolata																																																											+
Botryococcus braunii	+							+	+			+	+						+			+	+					+		+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+										
Closteriopsis acicularis	+						+		+	+	+	+				+	+		+		+		+	+																																		
C. longissima																																																											
Coccomyxa confluens					+				+	+	+		+					+					+	+	+	+			+			+																									
C. lacustris								+								+			+		+																																					
Coelastrum astroideum		+	+	+				+						+	+	+	+	+		+																																					
C. microporum		+			+	+	+							+		+	+	+			+																																				
Crucigenia tetrapedia																																																											
Crucigeniella apiculata																																																											
C. crucifera																+	+	+	+		+																																					
Coenocystis planctonica		+																																																									
Dictyospherium pulchellum	+	+	+									+	+							+		+	+	+																																
Echinosphaerella limnetica														+																																												
Franceia armata																																																											
F. echidna		+	+	+													+						+																																	
F. javanica																																																											
F. ovalis																									+	+	+	+																												
Golenkinia radiata	+												+	+	+												+	+																												
Kirchneriella aperta		+	+																																																							
K. contorta													+	+		+																	+																									
K. contorta var. elegans																	+		+									+																												
K. contorta var. lunaris																												+	+																												
K. dianae var. dianae																+	+																																								
K. irregularis var. spiralis	+	+	+									+	+																																													
K. lunaris			+	+																																																							
K. obesa													+																																														
K. subsolitaria																																																											
Lagerheimia ciliata														+											+	+	+																													
L. citriformis														+																																												
L. genevensis												+	+	+																																											
L. longiseta		+	+																																																						
L. marssonii																																																										

Taxa	III	V	VI	VII	VII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
L. subsalsa																																																										
Micractinium pusillum	+									+		+																																	+	+													
Monoraphidium arcuatum																																																										
M. circinale							+	+	+	+							+																																											
M. contortum	+	+	+	+		+		+	+	+	+	+	+		+								+	+	+	+					+	+	+	+	+							+	+	+	+	+												
M. griffithii		+	+	+											+																																												
M. komarkovae	+											+	+	+						+																																									
M. mirabile															+																																															
Nephrocytium agardhianum		+	+																																																								
Oocystis apiculata																	+	+	+			+	+																																						
O. lacustris																																																												
O. marssonii		+	+										+				+	+	+	+																																								
O. solitaria																		+	+	+																																									
Pachycladella minor										+																																																			
Pediastrum biradiatum		+																																																										
P. tetras		+	+	+	+	+	+						+	+	+	+	+						+	+					+																													
P. tetras var. tetraodon		+																																																									
P. boryanum	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
P. boryanum var. brevicorne	+			+			+	+					+	+					+	+	+		+																																			
P. boryanum var. longicorne	+		+	+	+	+	+						+	+	+						+		+																																				
Quadrigula lacustris					+														+	+																																								
Scenedesmus armatus		+					+																																																				
S. armatus var. bicaudatus																			+	+																																							
S. acuminatus	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+		+			+	+					+																														
S. acutiformis														+																																													
S. acutus		+	+																																																									
S. arcuatus																																																												
S. bicaudatus		+		+	+	+	+	+	+				+		+	+			+				+																																			
S. denticulatus		+	+	+	+									+	+	+	+	+																																								
S. dispar		+																											+																														
S. dispar var. costatus																																																											
S. ecornis	+	+	+	+	+	+		+	+				+	+	+	+	+		+		+								+			+	+	+																						
S. ecornis var. disciformis																+	+	+																																								
S. ellipsoideus var. bicaudatus																					+																																					
S. intermedius													+																																														
S. opoliensis					+																																																							
S. quadricauda	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+	+	+		+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
S. quadricauda var. maximus			+	+		+	+	+					+	+	+	+	+	+																																								
S. serratus																																																											
S. soli																																																											
S. spinosus	+	+	+		+	+	+	+	+	+		+	+			+			+	+	+					+																																	

Taxa	III	V	VI	VII	VII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
S. spinosus var. bicaudatus						+																																																					
Sphaerocystis planctonica																		+																																									
Tetraëdron caudatum		+	+											+	+	+	+	+					+											+				+																				
T. caudatum var. incisum		+													+																																												
T. constrictum														+																																													
T. hastatum				+	+		+							+	+	+	+																																										
T. limneticum		+			+											+	+																																										
T. minimum		+	+	+			+		+	+			+		+	+	+		+				+	+	+						+	+		+		+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
T. muticum					+				+						+	+																																										
T. regulare var. torsum		+																																																										
T. triangulare														+																																														
T. trilobatum		+																																																										
T. trigonum																																																												
T. trigonum var. gracile		+	+	+	+									+		+	+																																										
Tetrastrum elegans	+										+																																																	
T. glabrum	+	+	+								+	+	+	+	+																																											
T. staurogeniaeforme		+			+		+	+	+	+	+					+	+																																									
T. triachanthum	+										+																																																	
Treubaria planctonica		+	+		+										+	+	+						+																																				
T. schmidlei																																																												
Westella botryoides																																																												
Willea vilhelmii																																																												
Desmidiales																																																											
Closterium acutum var. acutum																		+	+																																									
C. acutum var. linea			+	+				+					+		+	+																																										
C. acutum var. variable														+																																													
C. gracile																																																											
Cosmarium granatum																																																											
C. laeve var. laeve		+					+																																																			
C. laeve var. pseudooctangulare		+			+		+											+					+																																		
C. polygonum var. acutus		+																																																								
C. regnellii var. minimum	+										+																																															
C. reniforme var. elevatum																+																																										
C. subcostatum var. minus		+																																																									
C. subreinchii																+	+	+	+		+																																						
C. tenue																																																											
Staurastrum chaetoceras																																																											
S. micron var. micron																+	+																																										

Taxa	III	V	VI	VII	VII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	III	V	VI	VII	VIII	IX	X	XI	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
S. muticum f. minor															+																																																				
S. paradoxum		+	+	+			+	+	+				+	+	+	+	+	+					+	+																																												
S. striatum										+	+										+																																														
S. tetracerum		+	+		+										+	+	+	+	+				+																																													
Teilingia granulata																																																																				
Euglenophyta																																																																				
Euglena acus												+	+	+	+	+	+	+	+			+	+			+				+	+	+	+	+	+		+	+	+																											
E. clara																																																																			
E. clavata		+	+			+									+																																																		
E. granulata																			+																																															
E. oxyuris f. oxyuris																								+		+		+																																				
E. proxima														+		+	+	+				+	+	+	+	+	+		+	+	+	+		+	+	+																											
E. spathirhynca		+																																																																
E. splendens		+											+																																																				
E. viridis		+																																																															
Lepocinclis ovum		+													+																																																	
Phacus alatus																			+																																														
P. brevicaudatus												+		+				+	+					+	+		+																																			
P. longicauda var. longicauda																												+																																			
P. longicauda var. tortus																						+						+	+			+	+	+																											
P. longicauda var. tortuosus																											+																																			
P. orbicularis															+	+	+																																														
P. pyrum var. pyrum		+	+		+										+	+	+		+					+																																							
Trachelomonas volvocina		+		+		+	+	+				+				+	+	+	+	+		+	+	+																																							
T. volvocina var. punctata																								+																																						
T. varians		+	+																																																													
Dinophyta																																																																			
Glenodinium pulvisculus																															+																																	
Gymnodinium excavatum																																																														
G. ordinatum								+																																																							
G. rotundatum							+												+																																											
Peridinium aciculiferum																								+																																						
P. cinctum																																																																
P. inconspicuum																											+																																			
P. umbonatum		+	+										+	+					+			+		+		+																																			

Conclusions

The analysis of the samples revealed a great diversity of the phytoplankton communities with 331 taxa belonging to 8 algal divisions. The number of species was higher in pond 3 than in the other two.

The values of Organic Pollution Index indicate heavy organic pollution for pond 1 and 2, and moderate one for pond 3.

Acknowledgements: The authors are grateful to the Institute of Biological Research for providing laboratory facilities.

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STRUCTURA COMUNITĂȚILOR ALGALE PLANCTONICE DIN LACURILE SITUATE ÎN CARTIERUL "ÎNTRE LACURI" AL MUNICIPIULUI CLUJ-NAPOCA

(Rezumat)

Parcul Între Lacuri, situat în partea estică a municipiului Cluj-Napoca cuprinde 3 lacuri: Lacul 1 este amenajat pentru agrement, Lacurile 2 şi 3 sunt neamenajate. Datorită adâncimii reduse, acestea fac parte din categoria zonelor umede.

Lucrarea prezintă rezultatele studiilor începute în primăvara anului 2004, fiind primele cercetări privind structura comunităților algale planctonice din aceste zone umede.

Analiza compoziției calitative a comunităților algale planctonice a dus la identificarea a 331 de taxoni. Majoritatea sunt elemente cu răspândire cosmopolită caracteristice apelor eutrofe. Valorile indicatoare ale speciilor precum şi valorile indicilor de troficitate calculați încadrează acestă zonă umedă în categoria celor eutrofe.

Valorile indicelui de poluare organică indică prezența substanțelor organice în cantități moderate în cazul Lacului 3 şi ridicate în cazul Lacurilor 1 şi 2.