Contribuţii Botanice, *XXXVII*, **2002**
Grădina Botanică "Alexandru Borza"
Cluj-Napoca

ALGAL FLORA OF THE TRANSITION PEAT BOG LOCATED NEAR THE IEZERU ŞURIANU GLACIAL LAKE (SEBEŞULUI MOUNTAINS, ROMANIAN SOUTHERN CARPATHIANS).

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Abstract: Algal flora of the transition peat bog located near the Iezeru Şurianu glacial lake (Sebeşului Mountains, Southern Carpathians, Romania). The paper deals with the algae inhabiting a transition peat bog situated near the so called Iezeru Şurianu glacial lake, Sebeşului Mountains (Southern Carpathians, Romania), comparatively with previous findings (Greguss, 1929; Péterfi, 1963). The peat bog was reinvestigated by the present authors in summer 1994. There were identified 117 algal taxa, mostly desmids and diatoms (Cyanophyta – 5, Glaucocystophyta – 1, Euglenophyta – 5, Dinophyta – 1, Chrysophyta – 4, Bacillariophyta – 38, Chlorophyta – Chlorophyceae – 5 and Conjugatophyceae – 57), almost twice as much as previously recorded. According to species composition, the community belong to the "transition peat bog community of Carpathian type" characterized by the presence of acidophilic species (*Anabaena aequalis, Euglena mutabilis, Cymbella gracilis, Navicula subtilissima* etc.) together with northern-alpine and montane elements (*Euastrum ansatum, E. elegans, Cosmarium hornavanense, Micrasterias denticulata* etc.).

Introduction

This work is part of a series of investigations carried out by the present authors during the last 40 years on the algal communities inhabiting the transition and raised peat bogs of the Romanian Carpathians.

The importance of transition and raised peat bogs is obvious, because they shelter algal communities with high species diversity, consisting mostly of diatoms and desmids. The Romanian raised peat bogs are even more important being situated at the southernmost limit of their distribution area (Pop, 1960). Unfortunately, many of the Romanian bog areas have been under pollution pressure of various type (industrial, agricultural, tourist's etc.). Some of the bog complexes including those situated in the Southern Carpathians became irreversible affected, like the most outstanding ones at Oaşa Mare (Borza, 1959; Pop, 1960), situated in the Şebeş Valley, which were floaded by a dam reservoir. Therefore, the study and preservation of the biodiversity of those which have not yet been deeply affected became a duty for the present generation of investigators.

According to Pop (1960) the *Sphagnum*-bogs of the Southern Carpathians (Retezat Mts., Şebeş Mts., Parâng Mts., etc.) differ from those situated in the Apuseni Mountains and Eastern Carpathians by their genesis being formed in glacial hollows or near the subalpine lakes, usually in the *Pinus mugo* belt, mostly at 1900 – 2000 m a.s.l. The peat bogs of the Apuseni Mountains and Maramureş Mountains are usually located at lower altitudes namely in the spruce fir or beech forest belts. There are differences between this two bog types as concerning their vegetation too. The high altitude or acidic, subalpine peat bogs of Carpathian type lack the glacial relics like *Andromeda polifolia, Vaccinium oxycoccos* var. *macrocarpa, Empetrum nigrum* or *Carex limosa,* which are very characteristic for the genuine raised peat bogs.

The peat bog herein dealt with has been formed in the eastern part of the glacial lake called „Iezerul Şurianu Mare" („Iezerul Mare") situated at 1700 m altitude a.s.l. (Pişota, 1971) just at timber line. Not very far from this lake, there is a small glacial hollow known as the "Iezeru Mic", which is usually dried out during the warmest period of the year. Its bottom is covered with a thick layer of silt consisting almost entirely of small organic particles and diatom frustules.

Both, the main glacial lake and the small water hollow were investigated by Greguss (1913, 1929) for their floras, especially for diatoms. He recorded 287 diatoms and later 16 desmids. The desmids were most probably collected from the nearby peat bog (their sampling site was not clearly indicated by Greguss), because 12 of them have subsequently been found in the peat bog by Péterfi (1963), and more recently by the present authors (see this paper).

Péterfi (1963) recorded from the peat bog 67 taxa, mostly desmids (diatoms were not investigated).

Material and methods

The samples were collected from various microhabitats of the peat bog during the summer of 1994. Most samples were collected by squeezing *Sphagnum*-bundles (metaphyton) or by absorbing with a pipette the mucilaginous brownish-green masses from the bottom of small depressions (microphytobenthos). The algae were preserved in 4% formalin and identified by using standard methods and identification books.

Results and discussion

There have been identified 117 algal taxa by the present authors, which are included in Table 1, together with the algae recorded previously from the same peat bog by Greguss (1929) – 16 desmids (see Borza, 1959) and Péterfi (1963) – 68 desmids and others (excl. diatoms). Therefore, the total number of algae recorded is 146.

The algae belong to the following groups: Cyanophyta – 9 taxa (6.48%), Glaucocystophyta – 1 taxon (0.68%), Euglenophyta – 14 taxa (9.59%), Dinophyta – 1 taxon (0.68%), Chrysophyta – 5 taxa (3.42%), Bacillariophyta – 38 taxa

(26.03%), Xanthophyta – 2 taxa (1.37%), Chlorophyta – Chlorophyceae – 6 taxa (4.11%) and Chlorophyta – Conjugatophyceae – 70 taxa (47.95%).

Table 1: Algal flora of the transition peat bog located near the Şurianu glacial lake

ALGAL TAXA	IDENTIFIED BY		
	Greguss, 1929	**Péterfi, 1963**	**present investigations**
1	2	3	4
CYANOPHYTA			
Anabaena aegualis			+
Anabaena minutissima		+	
Gloeocapsa minuta			+
Gloeocapsa turgida		+	+
Merismopedia elegans		+	+
Nostoc paludosum		+	
Stigonema ocellatum		+	
Synechococcus aeruginosus			+
Synechococcus major		+	
GLAUCOCYSTOPHYTA			
Glaucocystis nostochinearum			+
EUGLENOPHYTA			
Astasia inflata		+	
Euglena mutabilis			+
Helicotropis octeres		+	
Menoidium pellucidum		+	+
Menoidium semilunare		+	
Petalomonas mediocanellata		+	+
Phacus caudatus		+	
Phacus curvicauda		+	
Phacus longicauda f. attenuatus		+	
Rhabdomonas costata		+	
Rhabdomons incurva		+	
Trachelomonas volvocina		+	+
Trachelomonas volvocinopsis			+
DINOPHYTA			
Gloeodinium montanum			+
CHRYSOPHYTA			
Chrysastrella paradoxa			+
Chrysococcus rufescens			+
Chrysosphaera paludosa			+
Lepochromulina calyx			+
Ochromonas fragilis		+	
BACILLARIOPHYTA			
Achnanthes cryophyla			+
Achnanthes marginulata			+
Anomoeoneis serians var. brachysira			+
Cymbella angustata			+

1	2	3	4
Cymbella gracilis			+
Cymbella perpusila			+
Eunotia alpina			+
Eunotia crista-gali			+
Eunotia curvata			+
Eunotia exigua			+
Eunotia fallax			+
Eunotia gracilis			+
Eunotia microcephala			+
Eunotia pectinalis			+
Eunotia praerupta			+
Eunotia robusta			+
Eunotia septentrionalis			+
Eunotia sudetica			+
Eunotia tenella			+
Frustulia saxonica			+
Gomphonema parvulum			+
Neidium affinis			+
Neidium bisulcatum			+
Melosira islandica			+
Melosira distans			+
Navicula heufleriana			+
Navicula subtilissima			+
Pinnularia acrosphaeria			+
Pinnularia borealis			+
Pinnularia brebissonii			+
Pinnularia divergens			+
Pinnularia gibba var. mesogongyla			+
Pinnularia hilseana			+
Pinnularia microstauron			+
Pinnularia mollaris			+
Pinnularia sudetica			+
Stauroneis anceps			+
Stauroneis phoenicenteron			+
XANTHOPHYTA			
Characiopsis acuta		+	
Ophiocytium cochleare		+	
CHLOROPHYTA - CHLOROPHYCEAE			
Asterococcus superbus			+
Botryosphaera sudetica			+
Microspora floccosa		+	+
Microspora tumidula		+	+
Microthamnion strictissimum		+	+
Scenedesmus ecornis		+	

CHLOROPHYTA - CONJUGATOPHYCEAE			
Actinotaenium cucurbita		+	+
Arthrodesmus bifidus		+	+
Arthrodesmus incus var. extensus		+	+
Closterium exiguum		+	
1	2	3	4
Closterium gracile			+
Closterium lunula		+	+
Closterium lineatum			+
Closterium navicula			+
Closterium rostratum			+
Closterium striolatum	+	+	+
Closterium venus			+
Cosmarium alpinum	+		+
Cosmarium botrytis			+
Cosmarium caelatum			+
Cosmarium cucurbitinum f. minor		+	+
Cosmarium dificile			+
Cosmarium hornavanense			+
Cosmarium humile var. striatum		+	+
Cosmarium nasutum		+	+
Cosmarium pygmaeum		+	+
Cosmarium pyramidatum			+
Cosmarium trilobulatum var. majus		+	
Cylindrocystis brebissonii		+	+
Cylindrocystis crassa		+	+
Euastrum ansatum	+		+
Euastrum bidentatum		+	+
Euastrum binale		+	+
Euastrum circulare	+		+
Euastrum denticulatum		+	+
Euastrum didelta	+	+	+
Euastrum elegans	+	+	+
Euastrum humerosum		+	+
Euastrum insigne		+	+
Euastrum montanum		+	+
Euastrum oblongum	+		+
Euastrum venustum	+		
Gonatozygon brebissonii			+
Gonatozygon kinahanii			+
Hyalotheca dissiliens		+	+
Micrasterias crux-melitensis			+
Micrasterias denticulata		+	+
Micrasterias rotata	+	+	+
Micrasterias truncata		+	+
Netrium digitus		+	+
Netrium interruptum			+

1	2	3	4
Netrium oblongum			+
Penium cylindrus			+
Penium heimerlianum	+		
Penium spinospermum		+	+
Spondylosium secedens		+	
Spirotaenia condensata		+	+
Staurastrum capitulum		+	+
Staurastrum furcatum	+	+	+
Staurastrum glabrum		+	+
Staurastrum insigne		+	
Staurastrum margaritaceum		+	+
Staurastrum monticulosum var. bifarium		+	
Staurastrum muricatum		+	+
Staurastrum muticum	+		
Staurastrum orbiculare	+	+	+
Staurastrum pileolatum		+	
Staurastrum polytrichum		+	
Staurastrum punctulatum	+	+	+
Staurastrum scabrum		+	
Staurastrum sexcostatum		+	+
Staurastrum teliferum		+	
Tetmemorus granulatus	+	+	+
Tetmemorus laevis	+		+
Xanthidium aculeatum			+

Comparing the list of algae recorded by Péterfi (1963) with that performed by the present authors (diatoms excluded), one can observe that they are more or less similar. In 1994 there were identified somewhat more desmids (57 taxa) and chrysophytes, but less euglenophytes (only 5 taxa). Some of the eurytopic and eutrophic elements disappeared (*Phacus* ssp. *Characiopsis acuta, Ophiocytium cochleare, Scenedesmus ecornis* etc.), that might be explained by recent positive changes in the peat-moss cover. The newly recorded species are mainly sphagnofilous characteristic for transitory acidic peat bogs, such as the blue-green *Synechococcus aeruginosa*, the euglenoid *Euglena mutabilis*, some chrysophytes like *Chrysastrella paradoxa, Chrysosphaera paludosa* and *Leptochromulina calyx*, the greens *Asterococcus superbus* and *Botryosphaera sudetica*, as well as the desmids – *Closterium gracile, C. rostratum, Cosmarium dificile, C. pyramidatum* and *Netrium oblongum*. It should also be mentioned that most of the diatoms herein recorded are also acidophilic, typically bog forms, largely distributed in the Romanian high altitude transition *Sphagnum*-bogs (peat bogs of Carpathian type).

The pattern of the algal flora is given by *Anabaena aequalis*, *Synechococcus aeruginosus*, *Euglena mutabilis*, *Menoidium pellucidum*, *Petalomonas mediocanellata*, *Cymbella gracilis, C. perpusila*, most *Eunotia* species, *Frustulia saxonixa, Navicula subtilissima*, and especially by the various *Closterium,*

Cosmarium, Micrasterias, Penium, Netrium, and *Staurastrum* species (Table 1).

There are also present in the flora several montane and northern-alpine forms like the cyanobacteria *Stigonema ocellatum, Synechococcus major*, the dinophyte *Gloenodinium montanum*, the chysophyte *Ochromonas fragilis*, the diatoms *Achnanthes cryophila, Anemoeoneis serians* var. *brachisyra*, *Eunotia alpina, E. septentrionalis, Melosira islandica, Navicula haufleriana, Pinnularia acrosphaeria, P. divergens* as well as desmids like *Euastrum ansatum, E. didelta, E. elegans, Cosmarium hornavanense, Micrasterias denticulata*, *M. truncata, Staurastrum polytrichum, Tetmemorus granulatus* and others.

The present findings are similar with those recorded for other Romanian and European peat bogs (Lenzenweger, 1994; Momeu and Péterfi, 1993, 1993-1994; Péterfi, 1993; Rŭžička, 1973 etc.).

Conclusions

According to the structure of its algal communities, the peat bog located near the Iezeru Şurianu glacial lake (Sebeş Mountains) belongs to the mesotrophic high altitude *Sphagnum*-bogs of Carpathian type. The new findings indicate that bog developed during the last decades towards its climax stage and it is less polluted than before. Because, the most important raised peat bogs of the region, namely those situated in the Şebeş Valley at Oaşa Mare had been destroyed by the dam reservoir, the only peat bog left and herein dealt with should be carefully preserved and declared nature reserve.

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FLORA ALGALĂ A MLAŞTINII DE TURBĂ DE TRECERE DE LÂNGĂ IEZERUL ŞURIANULUI (MUNŢII SEBEŞULUI, CARPAŢII MERIDIONALI, ROMÂNIA)

(Rezumat)

Lucrarea prezintă algele care vegetează în sfagnetul de trecere de lângă Iezerul Şurianului din Munţii Sebeşului, comparativ cu rezultatele cercetărilor anterioare (Greguss, 1929; Péterfi, 1963). Din eşantioanele algale colectate în vara anului 1994 s-au identificat 113 taxoni, de două ori mai mulţi decât semnalaţi până atunci. Algele identificate fac parte din următoarele grupe sistematice: Cyanophyta – 5, Glaucocystophyta – 1, Euglenophyta – 5, Dinophyta – 1, Chrysophyta – 4, Bacillariophyta – 38, Chlorophyta – Chlorophyceae – 5 şi Conjugatophyceae – 57. Pe baza compoziţiei lor floristice comunităţile algale se încadrează în categoria celor mezotrofe de tip carpatin, de altitudine, caracterizat de specii acidofile şi acidobionte tipice (ca de ex. *Anabaena aequalis, Euglena mutabilis, Cymbella gracilis, Navicula subtilissima* etc.) împreună cu cele montane şi nordic alpine (ca de ex. *Euastrum ansatum, E. elegans, Cosmarium hornavanense, Micrasterias denticulata* etc.).