

RESEARCH ON BRYOPHYTES FROM OCHIU LAKE

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Abstract. Located in Argeș County, Ochiu Lake is part of a chain of swampy depressions, all formed by the landslides triggered by the deepening of the Valsan Valley. It was first referred to by GH. TURCU (1960) who indicated the presence of this crossing swamp with a central oligotrophic nest, the only one known in the Southern Carpathians areas at the time. In terms of hydrology, chemistry and flora, the features of the area vary considerably from the data known 50 years ago, the work showing especially the changes on bryophytes.

Keywords: Ochiu Lake, swamps, *Sphagnum*, bryoflora.

Rezumat. Cercetări privind brioflora de la Lacul cu Ochiu. Lacul cu Ochiu a fost semnalat pentru prima dată de GH. TURCU în anul 1960 ca fiind singura mlaștină de trecere cu un cuib central oligotrof, cunoscută în regiunile extracarpătice din sudul Carpaților Meridionali. Este situat în cadrul platformei gruiurilor argeșene și face parte dintr-o salbă de depresiuni înmlăștinite, formate toate prin alunecările de teren care s-au declanșat după adâncirea văii Vâlsanului. În ceea ce privește aspectele hidrologice, chimice și floristice, fizionomia zonei variază considerabil față de datele cunoscute de acum 50 de ani, lucrarea prezentând modificările survenite în special în ceea ce privește briofitele.

Cuvinte cheie: Lacul cu Ochiu, mlaștină, *Sphagnum*, brioflora.

INTRODUCTION

The wetlands are remarkable ecologic sites, recognized today as biodiversity reserves.

Wetlands is a collective term for water units classified as swamps, bogs, ponds and rush-beds found along the coasts or marine and ocean shores, within the river basin perimeters, along the major water-courses, especially in the lower sectors of the grasslands, as well as in other flat areas (VANDERPOORTEN & GOFFINET, 2009; GOFFINET & SHAW, 2009).

Ochiu Lake is situated on the left side of the Valsan river, about 3 km away from Stroești village, Argeș county. It was first referred to by TURCU (1961) who indicated the presence of this crossing swamp with a central oligotrophic nest, the only one known in the Southern Carpathians areas at the time (TURCU, 1961).

Located in the platform of Arges hills, Ochiu Lake is part of a chain of swampy depressions, all formed by the landslides triggered by the deepening of the Valsan Valley (Fig. 1). The examination of the physical and geographical conditions, as well as the positioning factors, showed that the development of oligotrophic central area was due to topographic conditions and accumulation of large amounts of oligotrophic water coming from streams and infiltrated through crystalline, siliceous gravel, poor in nutrients (TURCU, 1970).

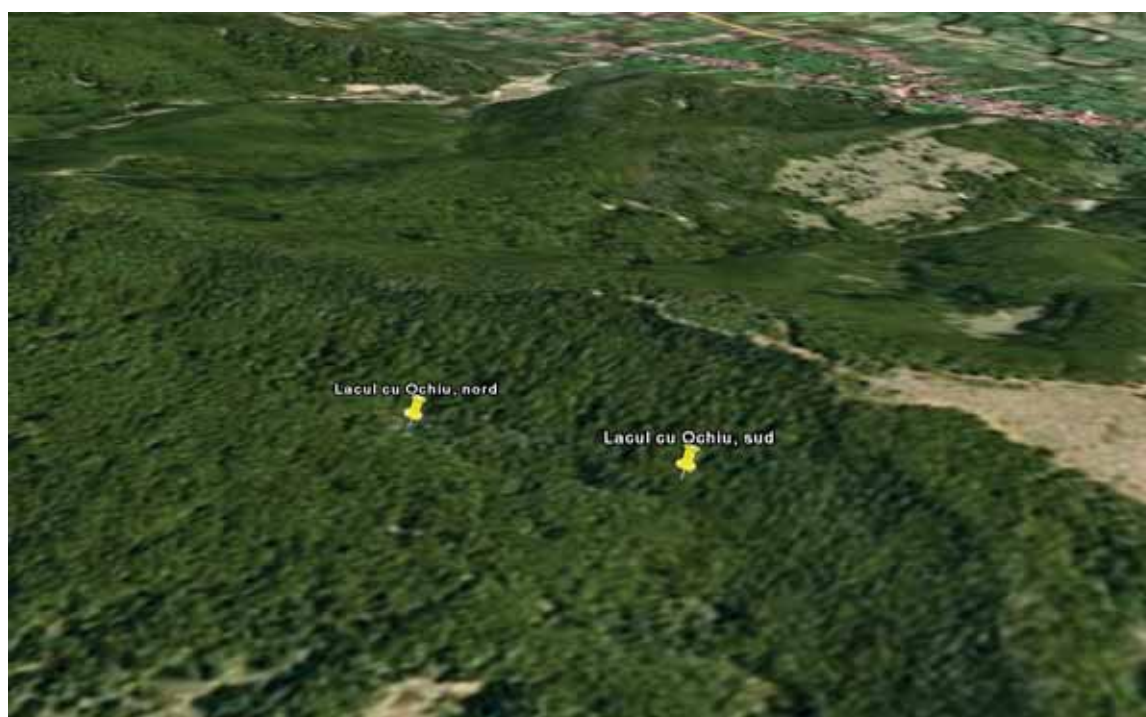


Figure 1. Ochiu Lake. / Figura 1. Lacul cu Ochiu (original, hartă realizată cu programul *Google Earth*).

Ochiu Lake occupied an area of about 5 000 m², completely covered with vegetation, and 1.5 – 2 m thick sublayer of *Sphagnum*, which contained species specific to bogs (*Eriophorum vaginatum*, *Drosera rotundifolia*, *Betula pubescens* and *B. hybrida*).

Sphagnum species was determined by Tr. Ștefureac as *Sphagnum recurvum* var. *amblyphyllum* and *S. magellanicum* var. *roseum* (sometimes passing into var. *purpurascens*) (TURCU, 1961).

MATERIAL AND METHODS

In our research we made trips to “Ochiu Lake” in the months September-November 2009 and April 2010, we collected bryophytes, we made pH measurements and marked more GPS points (100-112) on which we drew the map of the area and measured the lake surface.

Of some species of bryophytes analysed, numerous original colour photographs were made that were intended to highlight features of morphology, to complete descriptions and to ease of identifying species.

Identification was done using relevant bryological literature. Nomenclature was actualized according to Hill (HILL *et al.*, 2006).

RESULTS AND DISCUSSIONS

The description of the collecting sites is determined by the following geographic coordinates: Lake Ochiu - N - 45°07'00.0"- 45°07'06.6"; E - 24°49'02.2"- 24°49'05.5"

The data in the field show a lake altitude ranging from 587 m (point 102: N 45° 07,033', E 024° 49,077') to 615 m (point 110: N 45° 07,062', E 024° 49,040') and a pH value of 4.

Compared with the data published by Turcu 50 years ago, the current situation in the field is highly different, in that the lake has a water band whose width varies between 1.5 (in point 104: N 45° 07.065 'E 024° 49.072') and 3 m (in point 111: N 45° 07.042 'E 024° 49.056') (Fig. 2), while the inside is a heavily forested area with *Betula pubescens*, *Betula hybrida*, *Alnus glutinosa* and *Salix cinerea* (Fig. 3), interrupted here and there by waterholes.

By adding this water band around the lake, its surface has doubled (approx. 10,000 m²).

The northern end of Ochiu Lake develops groups of *Carex vesicaria*, *C. pseudocyperus*, *Juncus effusus* and *Sparganium erectum*.

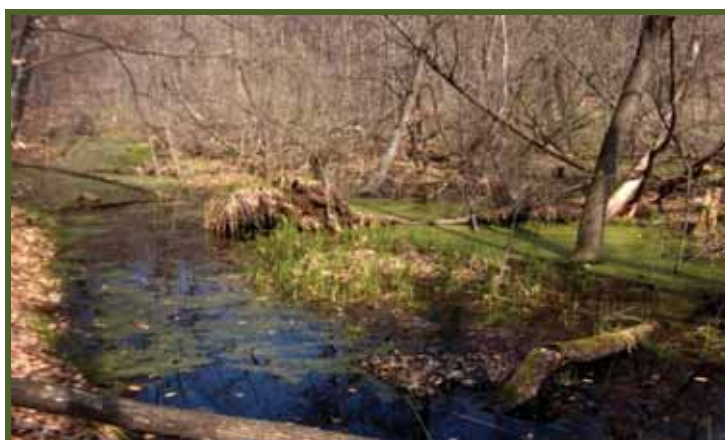


Figure 2. Ochiu Lake surrounded by a band of water. / Figura 2. Lacul cu Ochiu înconjurat de o bandă de apă (original).



Figure 3. Ochiu Lake - Aspect of forest area. / Figura 3. Aspect din zona împădurită a Lacului cu Ochiu (original).

The vertical structure of the lake has a 30 cm soil layer, below which it lies a water layer with plant debris, 2 m deep, and a mud layer on the bottom. The waterbed is responsible for the movement of the superficial layer under the weight of each step. *Sphagnum* species were not found in vegetative state, but were identified microscopically in the soil samples (Figs. 4, 5).

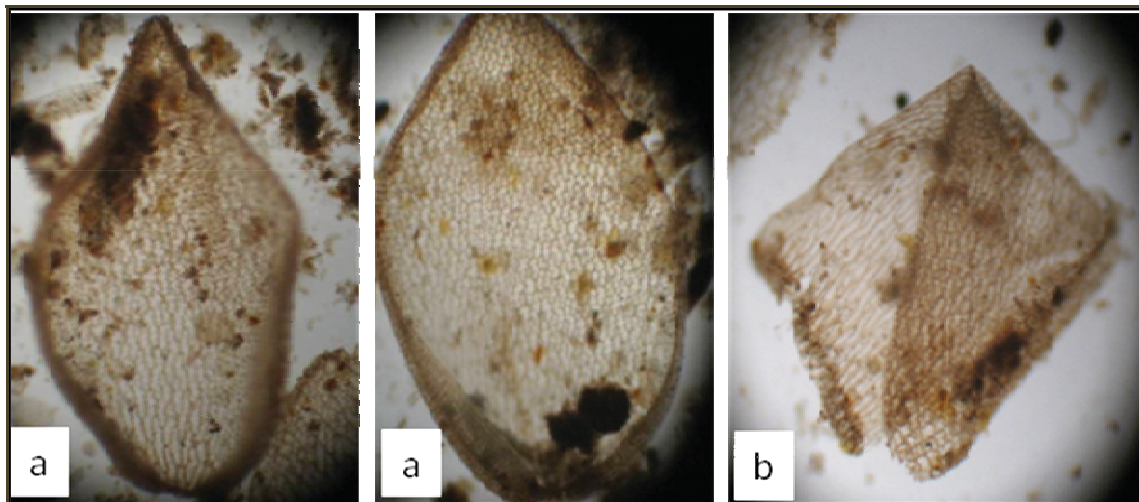


Figure 4. *Sphagnum magellanicum*: Leaf frames (a) and Leaf stems (b). / Figura 4. *S. magellanicum*: Frunze rameale (a) și tulpinale (b) (10X4X4) (original).

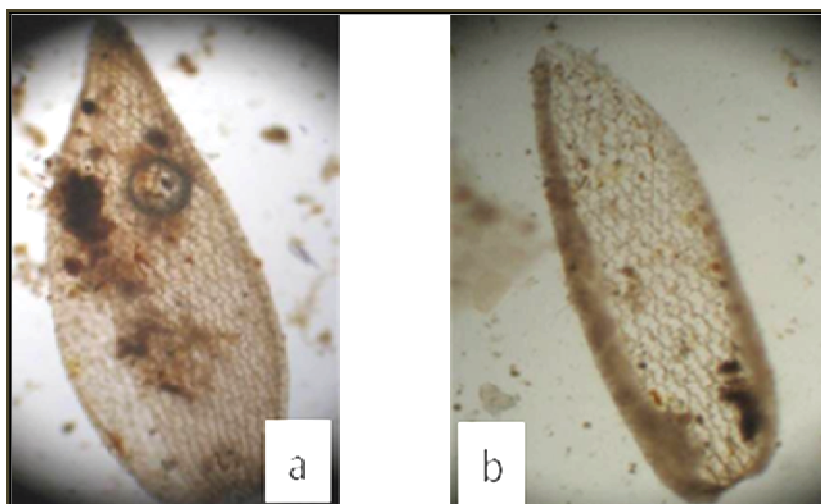


Figure 5. *Sphagnum recurvum* var. *amblyphyllum*: Leaf frames (a) and Leaf stems (b). / Figura 5. *S. recurvum* var. *amblyphyllum*: Frunze rameale (a) și tulpinale (b) (10X4X4) (original).

At Lake Ochiu the following species of bryophytes were identified: *Riccia fluitans* L., *Lophocolea heterophylla* (SCHRAD.) DUMORT., *Sphagnum magellanicum* BRID. var. *roseum* WARNST., *S. recurvum* P. BEAUV. var. *amblyphyllum* (RUSS.) WARNST., *Atrichum undulatum* (HEDW.) P. BEAUV., *Polytrichastrum formosum* (HEDW.) G. L. SM., *Orthotrichum affine* SCHRAD. EX BRID., *Rhizomnium punctatum* (HEDW.) T. J. KOP., *Hypnum cupressiforme* var. *cupressiforme* HEDW., *H. cupressiforme* var. *lacunosum* BRID., *H. cupressiforme* var. *resupinatum* (TAYLOR) SCHIMP., *H. jutlandicum* HOLMEN & E. WARNCKE, *Leucodon sciuroides* (HEDW.) SCHWÄEGR.

With regard to the number of taxa, the best represented is *Hypnum* species (Fig. 6), while the largest populations belong to *Atrichum undulatum* and *Polytrichastrum formosum* species.

The anthropogenic pressure exerted on these habitats (drainage, deforestation, peat extraction) in the course of time, caused significant, sometimes irreversible changes, resulting in the reduction of peat bogs areas and restricting habitats of vascular plants species and specific bryophytes.

For the current state of *Sphagnum* species, we took into account the over-collection hypothesis founded by CHURCH *et al.*, 2001, and learned from the discussions with the locals that the peat moss was extensively mined and used for building wells (CHURCH *et al.*, 2001).

Ochiu Lake has evolved in its dynamics, consisting of a mosaic of units in various stages of development, in other words, parts of different origin, thus observing both plants specific to wetlands, and some interesting plants, specific to eutrophic swamps.

Although we have chosen to study only bryophytes, Ochiu Lake is an oligotrophic swamp, with mesotrophic and eutrophic areas requiring further research in terms of flora and vegetation.



Hypnum cupressiforme var. *cupressiforme*



Hypnum cupressiforme var. *resupinatum*



Figure 6. Differentiation of the genus *Hypnum* taxa according to the leaf appearance and mode of insertion on the stem.
 Figura 6. Diferențierea taxonilor genului *Hypnum* după aspectul frunzelor și modul de inserare pe tulpină (original).

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