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A PEAT-BOG VEGETAL ASSOCIATION WITH *BETULA NANA* L. AND *ERIOPHORUM VAGINATUM* L. IN BUCOVINA (ROMANIA)

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Abstract: *Betula nana L.* is a species spreaded on circumpolar-northern area. This species is, also, present into the Romanian flora as a relictic one, being met only in two places, namely: the peat-bog Luci, Harghita county, and the peat-bog Lucina, Suceava county. It seems that species reach its southern worldwide range in Romania (in the Natural Reserve Luci), at 46º17'40" northern latitude, and at 1.080 m. s. l.

The authors analyse flora and vegetation from the 2nd place where is met *Betula nana L.* in Romania: the Natural Reserve Lucina-Găina. There, *Betula nana L.* make up a well-defined population on a one ha surface of that natural reserve. Also, in the paper there is a proposal of a new status for that vegetal association, edificated by *Betula nana L.*, and having as a characteristic species, *Eriophorum vaginatum L.*

Key words: relict, peat-bog, association, *Betula nana L.*

Our investigations were made in the years of 1998-1999, on a basis of the research project Nº 44/1998-99, code 77.

The Lucina Depression is situated in the northern part of the Obcina Mestecănişului, at the base of the Lucina Massif.

The Natural Reserve Lucina is toward Găina rivulet, which is tributary of the Lucava rivulet, at NNE of the village Cârlibaba.

This reservation with *Betula nana L.* is situated on a depression at around 1,200 m. s. l., on a geologic substratum made from crystaline schists, marl-gritstones and conglomerates. The soils are like the next: podzols (humic, humic-peat, bog-peats, bog peat-gleyic), humic gleyic acid peat soils and humic gleyic acid soils, and renzina humus carbonate soils.

This peat bog (high bog, raised bog, high moor) has been discovered by Professor M. Guşuleac, in 1912 (E. ŢOPA, 1969).

In the past, this region has been covered by spruce woods, in their ecological optimum; those woods have been gradually cleared and anthropogenic changed; few of the largely depressions along the valleys had turned into swamp formation and the Scottish pine *(Pinus sylvestris L.*) invaded this new biotop, where it remained until now. This is due to the man's influence, on the very small surfaces, both in the peat bogs on the Lucina-Găina Plateau, and the surrounded woods (e. g. the Mountain Răchitişul Mare, along the Tătarca Mare rivulet, and so forth).

The climate is relatively cold and rich in precipitations (over 1000 mm/year; the average yearly temperature is under 4°C); this means that soil is permanently wet, allowing the installation and development of the meso- and hygrophyllous vegetation, and of course, the peat bogs vegetation.

Under these ecological features the vegetation is made by woods of Norway spruce (*Picea abies (L.) Karsten*) on the surrounded frame mountains of the depression,

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natural secondary mesophilic and mesohygrophilous meadows (dominated and edificated by: *Festuca rubra L., Agrostis capillaris L., Nardus stricta L., Deschampsia cespitosa (L.) Beauv., Cynosurus cristatus L., Festuca pratensis Hudson, Poa trivialis L., Carex montana L., Sphagnum fallax Klinggr., Eriophorum vaginatum L., Carex rostrata Stokes, Scirpus sylvaticus L., Filipendula ulmaria (L.) Maxim., Polygonum bistorta L.,* and so on; just on the bottom of that depression, where the water is stagnant, there is a relatively large surface (around 1 ha) of hygrophylous vegetation - the Găina-Lucina peat bog.

This peat bog is formed in postglaciar, when the present vegetation type was installed, too. In the past, the number of these kind of peat bogs was larger there, but gradually, these peat bogs decreased from numerical and surfaces points of view, as a result of settled down there of a horse farm and of a drainage device in some of those peat bogs, in order to get a great quantity of fodders.

Nowadays there are a lot of small bog peats and also various transition stages towards the peat bogs.

From surroundings of this natural reserve with *Betula nana L.,* were quoted until now about 420 vascular plants, and also a large number of bryophites; among these, some of them come to confirm the characteristic flora and vegetation from the Lucina peat bog, as are listed below: *Pinus sylvestris L.* f. *turfosa Woerlein, Juniperus communis L., Betula x hybrida Bechst.(=B. pubescens Roth x pendula Roth), B. nana L., B. pubescens Roth, B. x warnstorfii C. K. Schneid. (=B. pubescens Roth. x humilis Schrank), Salix aurita L., S. rosmarinifolia L., Andromeda polifolia L., Vaccinium myrtillus L., V. vitis-idaea L., Carex curta Good. , C. capillaris L. ssp. capillaris, C. flacca Schreber, C. flava L., C. acuta L., C. lepidocarpa Tausch, C. ovalis Good. , C. montana L., C. ornithopoda Willd., C. pallescens L., C. paniculata L., C. pauciflora Lightf., C. rostrata Stokes, C. echinata Murray, C. vesicaria L., C. nigra L., C. vulpina L., Eriophorum vaginatum L., E. latifolium Hoppe, E. angustifolium Honckeny, E. gracile Koch ex Roth, Calamagrostis stricta (Timm) Koel., Ligularia sibirica (L.) Cass., Menyanthes trifoliata L., Potentilla palustris (L.) Scop., Polemonium caeruleum L., Herminium monorchis (L.) R. Br.*, and so on.

That peat bog preserves in its limits the glacial age (arctic, boreal) relictic species, *Betula nana L.*. Other characteristic species for this depression are: *Betula x warnstorfii C. K. Schneid., Helodium blandowii (Web. et Mohr.) Warnst.* (Tr. ŞTEFUREAC, 1956), *Viola epipsila Ledeb*. (E. POP 1965), *V. palustris L.* (I. MORARIU, 1972).

Betula nana L. has the southern limit of its world range in Romania, that is the bog peat Lucs (Harghita county); *Betula nana L.* has been discovered there by the wellknown botanist E. I. Nyárády, in 1926, at 46°17'40" northern latitude and at 1.080 m. s. l.

Betula nana L. has striking roots and grows on the bog peats (made by various species of *Sphagnum* sp. and *Polytrichum* sp.), where it grows hard and build up cushions of 30-50 (-120) cm higher. Some of the branches even form adventitious roots after their sink into the bog peat (E. ŢOPA, 1926).

Part of the Lucina Depression is occupied by a bog peat on humic gleyic acid peat soils. In this peat bog, along the Găina rivulet valley is met, as enclaves, clusters of *Betula nana L.*; this species, with an other characteristic species, *Eriophorum vaginatum L.*, make up well defined phytocoenoses; those phytocoenoses have a structure and composition apart from the other vegetation which cover that peat bog, in general. From this reason, we make now the next proposal, to frame these phytocoenoses in a new vegetal association, namely: ass. *Eriophoro vaginati-Betuletum nanae* stat. nov. (Table 1).

Betula nana L. is depicted as a compact shrub, with a height of 60-100-120 cm, covering the surface of the peat bog as far as 50-75%. Among those bushes and under them there are a very thick moss layer, most of this being made by species of *Sphagnum* sp., with a coverage as far as 50-80%.

In that region (Lucina Depression) other floristics and vegetational studies were made, by F. HERBICH (1859), E. POP (1928-1929), P. RACLARU & N. BARBU (1959), M. GUȘULEAC, T. ȘTEFUREAC, D. PUȘCARU & E. PUȘCARU-SOROCEANU (manuscript). However, the nucleus with *Betula nana L.* was mentioned, until now, only in a paper by P. RACLARU & N. BARBU (1959), where this species is present more significantly; this nucleus was framed out by the same authors in the vegetal association *Eriophoro-Sphagnetum recurvi* Hueck 1925. Later on, other botanists have framed out this nucleus in a new coenotaxon: subass. *betuletosum nanae* Pop, Boșcaiu & Rădulescu 1973. Still, one could easily remark the very different floristics structure of this relevé, besides other phytocoenoses framed out in that vegetal association.This fact made us to frame these phytocoenoses, from coenotaxonomical point of view, like this:

Cl. *Oxycocco-Sphagnetea* Br.-Bl. et Tx. 1943
Ord. *Sphagnetalia magellanici* (Pawl. 1928) Moore (1964) 1968
Al. *Sphagnion magellanici* Kästner et Flössner 1933
As. *Eriophoro vaginati-Betuletum nanae* stat. nov. (=*Eriophoro-Sphagnetum recurvi* Hueck 1925 subass. b*etuletosum nanae* Pop, Boșcaiu & Rădulescu 1973).

Around those phytocoenoses, there were identified other species, like these: *Ligularia sibirica (L.) Cass., Deschampsia cespitosa (L.) Beauv., Carex pauciflora Lightf., C. curta Good., Betula pendula Roth, Salix pentandra L., Pinus sylvestris L., Picea abies (L.) Karst., Viola epipsila Ledeb.* (I. MORARIU), *Betula x warnstorfii C. K. Schneid., Vaccinium oxycoccos L., Sphagnum capillifolium (Ehrh.) Hedw., Polytrichum commune Hedw., Pleurozium schreberi (Brid.) Mitt., Sorbus aucuparia L., Deschampsia flexuosa (L.) Trin., Calamagrostis villosa (Chaix) J. F. Gmelin, Potentilla erecta (L.) Räuschel., Polygala vulgaris L., Salix pentandra L., S. silesiaca Willd., Caltha palustris L.* ssp. *laeta (Schott, Nym. et Kotschy) Hegi, Polygonum bistorta L., Succisa pratensis Moench, Lythrum salicaria L.*

We have made this new coenotaxonomical framing of those phytocoenoses with *Betula nana* from Lucina Natural reserve, since this species being a relictic species at its southern limit, is worth to be maintained as an independent coenotaxon; besides these, we made a combination between two vascular plants, in order to be more accesible for most of the phytocoenologists.

Releve No. 1 is a nomenclatural type one.

The botanical nomenclature is taken out from FLORA EUROPAEA (1st ed.)

Cl. *Oxycocco-Sphagnetea* Br.-Bl. et Tx. 1943
Ord. *Sphagnetalia magellanici* (Pawl. 1928) Moore (1964) 1968
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Tab. 1

Releve surface, sq. m.	400	400	400	400	400	400	400	400	400	400	400
Coverage, %	95	90	95	90	95	95	90	100	90	95	100
Tree cover, %						35					
Shrub, %	20	55	80	60	55	35	90	30	10	70	40
Releve Nº.	1	2	3	4	5	6	7	8	9	10	11
Caract. ass.											
Eriophorum vaginatum	3	1	+	1	1	1	+	3	4	+	3
Betula nana	2	4	5	4	4	3	5	3	1	4	3
Sphagnion, Sphagnetalia et Oxycocco-Sphagnetea											
Vaccinium oxycoccos	+	-	-	-	-	-	-	1	+	+	+
Sphagnum acutiformis	1	+	2	+	1	+	+	3	3	2	3
Magnocaricion											
Calamagrostis stricta	-	-	-	-	+	-	-	-	+	+	+
Carex acutiformis	-	-	-	1	-	-	-	-	-	-	-
Carex rostrata	+	+	-	+	+	+	-	+	-	-	-
Carex echinata	+	+	-	+	-	-	-	+	-	-	-
Vaccinio-Piceetea											
Vaccinium myrtillus	2	1	+	1	+	2	+	+	+	2	+
Vaccinium vitis-idaea	+	+	-	+	+	+	+	+	+	+	+
Picea abies	+	+	+	+	+	+	-	-	-	-	-
Pinus sylvestris f. turfosa	+	+	+	+	-	-	-	3	-	-	+
Sorbus aucuparia	+	+	-	-	-	-	-	-	-	-	-
Betula pendula	-	+	-	-	-	-	-	+	-	+	-
Betula x warnstorfii	-	-	-		+	-	-	-	-	-	-
Deschampsia flexuosa	+	-	-	-	+	+	+	+	+	+	+
Calamagrostis villosa	-	-	-	-	-	-	-	+	+	+	+
Nardo-Callunetea											
Nardus stricta	-	-	-	-	-	-	-	1	+	-	1
Potentilla erecta	-	-	-	-	-	-		+	-	-	+
Polygala vulgaris	-	-	-	-	-		-	+	-	-	-
Alnion											
Salix aurita	-	-	-	-	-	-	-	+	+	-	+
Salix pentandra	-	-	-	-	-	+	-	-	-	-	-
Betulo-Adenostylion											
Salix silesiaca	-	-	-	-	-	-	+	-	-	-	-

Molinietalia											
Caltha palustris ssp. laeta	-	-	-	-	-	-	-	+	-	-	+
Deschampsia cespitosa	-	-	-	-	-		+	-	+	-	-
Agrostis capillaris	-	-	+	+	-	-	-	+	+	-	-
Polygonum bistorta	-	-	-	1	1	-	+	+	-	-	+
Succisa pratensis	-	-	-	-	-	+	+	-	-	-	-
Lythrum salicaria	+	-	+	-	-	-	-	-	-	-	-

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