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ON THE BRYOFLORA OF THE «BRYANSKY LES» RESERVE (NERUSSO-DESNYANSKOYE POLESSYE, EUROPEAN RUSSIA)

К БРИОФЛОРЕ ЗАПОВЕДНИКА «БРЯНСКИЙ ЛЕС» (НЕРУССО-ДЕСНЯНСКОЕ ПОЛЕСЬЕ, ЕВРОПЕЙСКАЯ ЧАСТЬ РОССИИ)

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Abstract

The annotated list of the bryophyte of the reserve «Bryansky Les» includes 121 species and 1 variety. For each species we show the systematic, the living place, locations of the rare species and the ecological group.

Резюме

Аннотированный список мохообразных заповедника «Брянский лес» состоит из 121 вида и 1 разновидности. Для видов указаны частота встречаемости, эколого-ценотическая приуроченность, субстраты поселения, места сбора редко и очень редко распространенных бриофитов.

INTRODUCTION

Nowadays the inventory of biodiversity is an important task, and especially so in protected areas where it may serve for further monitoring of habitat changes. The aim of the present study is to characterize the bryoflora of Bryanky Les Reserve for the assessment of floristical, structural and ecological diversity of standard communities.

STUDY AREA, MATERIAL AND METHODS

The reserve «Bryansky Les» was established in Trubchevsky and Souzemsky Districts of Bryansk Province in 1987. It is situated in the Pridesnyansky physiographical region of the Predpolesskaya province of mixed forests (Gvozdetsky & Zhuchkova; 1963). The territory of the reserve is 121.86 sq. km. Forests cover 77% of its territory; most of them belong to pine and oak-pine forests (37%) and their derivates (36%). Forests of birch and aspen are spread on the watershed and nearby areas.

Peatlands occupy 21 sq.km, or 18% of the reserve territory. There is a variety of types dominated by hypnalean mosses, *Sphagnum*, sedges, grasses, and *Alnus*. Most of them are eutrophic (70%), while some are mesotrophic (25%) and oligotrophic (5%). Meadows occupy about 10% of the territory and are characteristic for flood plains (Fedotov &Yevstigneyev; 1997).

The bryoflora of the reserve «Bryansky Les» has been investigated by some authors (Popov; 1988; Fedotov & Yevstigneyev; 1997; Fedotov; 1999; Morosova; 1999; Yevstigneyev; 1999). These authors reported 98 species, however their specimens in the herbarium of the reserve include only 55 species. Most species were identified for the ecological and geobotanical studies, thus representing mainly dominant species. Some species were found to be characteristic for certain types of mires and forest communities (Fedotov & Yevstigneyev; 1997).

In 2004-2006 the bryophyte vegetation of the reserve was studued. The releves were made for the standard plots of 10 m^2 for meadows and mires, and 100 m^2 for forests. The position of bryophyte species within this or that bioecological group was identified from the combined datamatrix that includes both bryophytes and vascular plants (cf. Smirnova et al.; 2004).

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THE ANNOTATED LIST OF MOSSES

The vaucher speciemens are kept in the Department of Botany of the Bryansk State University.

In the following list, the nomenclature is given according to Ignatov, Afonina, Ignatova et al. (2006) for mosses and according to Konstantinova et al. (1992) for hepatics.

The frequency is abbreviated as follow: rr – very rare (from 1 to 4 samples); r – rare (5–10); sp – sporadic (10–19); fq – frequent (20–50); fqq – very frequent (over 50).

After the species frequency, the abbreviation of bioecogroup is given: Br – boreal forest, Nm – nemoral forest, Pn – pine forest, MFr – fresh meadow, MDr – dry meadow, InW – aquatic, Olg – oligotrophic bogs, Sw – mesotrophic mires, Ad – adventive, Nt – nitrophillous. This grouping follows Smirnova et al. (2004) and the position in a group was identified by the constancy and the most frequent occurrence within this or that group of plant communities.

Types of vegetation and characteristic substrates are given as well.

In the end of annotations, the numbers refer to the publications as follow: 1 – Fedotov (1999); 2 – Fedotov & Yevstigneyev (1997); 3 – Morozova (1999); 4 – Popov (1988).

Species mentioned only in literature, but not confirmed by herbarium specimens are marked by asterisk *. For rare species their localities are specifies up to kv. (=kvartal, or forest unit).

Abietinella abietina (Hedw.) Fleisch. – fq, MDr, steppe, bushy meadows, roadside meadows; on soil and rocks; 2, 3.

Amblystegium serpens (Hedw.) Bruch et al. – sp, Nm, broad-leaved and birch-aspen forests; on tree trunks, soil, rocks; 2, 3.

A. serpens var. *juratzkanum* (Schimp.) Rau & Herv. – sp, Nm, broad-leaved and birch-aspen forests; on soil and rocks.

Anomodon longifolius (Brid.) Hartm. – fq, Nm, flood-plain broad-leaved and alder forests; on tree trunks; 3.

A. viticulosus (Hedw.) Hook. & Tayl. – fq, Nm, flood-plain broad-leaved forests, more rarely in mixed forests with spruce; on tree trunks; 3.

Atrichum undulatum (Hedw.) P. Beauv. – sp, Nm, birch-aspen forest and broad-leaved forests with spruce with open herb-layer; on rotten wood and soil; 1, 2, 3.

Aulacomnium palustre (Hedw.) Schwägr. – fq, Sw, boggy pine forest with *Ledum*; on soil and rotten wood; 1, 2, 3.

Brachytheciastrum velutinum (Hedw.) Ignatov & Huttunen – fq, Nm, flood-plain broad-leaved forests; on tree trunks and rotten wood.

Brachythecium albicans (Hedw.) Bruch et al. – r (4 samples kv. in 29; 3 in kv. 30), MDr, steppe, bushy meadows; on soil and rocks; 2.

B. campestre (Müll. Hal.) Bruch et al. – sp, Nm, broad-leaved forests; on soil and rocks; 1, 3.

B. mildeanum (Schimp.) Schimp. – fq, MFr, fresh flood-plains, wet post-forest meadows; on soil; 1.

B. rivulare Bruch et al. – fq, Nt, alder swamp; on rotten wood and soil; 1, 3.

B. salebrosum (F. Weber & D. Mohr) Bruch et al. – sp, Nm, flood-plain broad-leaved forests; on soil and tree trunks; 2, 3.

Bryum argenteum Hedw. – fq, Ad, bushy meadows, roadside meadows; on soil and rocks; 2, 3.

B. caespiticium Hedw. – fqq, Ad, broad-leaved and coniferous-broad-leaved forests; on rotten wood and soil; 2, 3.

B. pseudotriquetrum (Hedw.) Gaertn.et al. – sp, Sw, mires dominated by hypnalean mosses, sedges, grasses+*Sphagna*; on soil; 1, 2, 3, 4.

Buxbaumia aphylla Hedw. – rr (2 samples in kv. 27), Pn, pine forest with lichen cover and with *Vaccinium vitis-idea*; on soil; 2, 3.

Callicladium haldanianum (Grev.) H.A. Crum – fqq, Pn, mossy pine forests; on rotten wood and soil; 3.

Calliergonella cuspidata (Hedw.) Loeske – fqq, MFr, fresh flood-plain meadows, on soil; more rarely in alder swamps, on soil and rotten wood; 1, 2.

Calliergon cordifolium (Hedw.) Kindb. – fqq, MFr, fresh flood-plain, bushy wet meadows; more rarely in alder swamps and grassy mires, on soil; 1, 2, 3.

C. giganteum (Schimp.) Kindb. – sp, Nt, wet flood-plains, alder swamps, sedge-Sphaga mires; on soil; 1, 2, 3.

Campylidium sommerfeltii (Myr.) Ochyra – sp, Nm, broad-leaved forests with open herbaceous layer; on rotten wood.

Ceratodon purpureus (Hedw.) Brid. – fq, Ad, bare soil along ground roads and trails in forests, fresh flood-plains; on soil, tree trunks, rocks; 1, 2, 3.

Climacium dendroides (Hedw.) F. Weber & D. Mohr – fqq, Nt, pine forests with hypnalean mosses, Sphagna, and *Vaccinium myrtyllus*, flood-plain alder forests, bushy mires with hypnalean mosses; on soil, bases of tree trunks, rotten wood; 1, 2, 3.

Cratoneuron filicinum (Hedw.) Spruce – r (1 sample in kv. 41, 4 samples in kv. 57; 2 samples in kv. 94), Sw, hypnalean mires, calcareous rock outcrops near springs; on soil and rocks; 1.

Dicranella heteromalla (Hedw.) Schimp. – sp, Nm, flood-plain broad-leaved forests; on soil; 2, 3.

D. rufescens (Dicks.) Schimp. – sp, Pn, *Calamagrostis* meadow in whatershed; on soil; 2, 3.

Dicranum bonjeanii De Not. – r (5 samples in kv. 116), Olg, sphagnous and sphagnous–grassy mires; on soil; 1.

D. fragilifolium Lindb. – r (5 samples in kv. 100; 2 samples in kv. 117), Nm, flood-plain broad-leaved forests; on tree trunks; 3.

D. montanum Hedw. – fq, Nm, flood-plain broad-leaved forests; on rotten wood, tree trunks and soil; 3.

D. polysetum Sw. – fqq, Pn, pine and birch forests, on rotten wood and soil; 2, 3.

D. scoparium Hedw. – sp, Pn, mossy and herbaceous pine forests; on rotten wood, soil and rocks; 1, 2, 3.

D. viride (Sull. & Lesq.) Lindb.– r (6 samples in kv. 100; 2 in kv. 121), Nm, old oak forests in flood plain; on tree trunks and rotten wood; 3.

Drepanocladus aduncus (Hedw.) Warnst. – sp, Sw, mires dominated by hypnalean mosses, grasses, sedges, alder swamps, springs**;** on soil; 1, 3.

D. polygamus (Bruch et al.) Hedenäs – sp, Sw**,** mires dominated by hypnalean mosses, rarely in oak forests; on soil and wood; 3**.**

Eurhynchiastrum pulchellum (Hedw.) Ignatov & Huttunen – sp, Nm, wet broad-leaved and coniferous forests; on tree trunks and soil; 2, 3.

Fissidens bryoides Hedw. – sp, Nm, wet and fresh flood-plain meadows, and their edges with scattered trees; at base of tree trunks, soil and rotten wood.

Fontinalis antipyretica Hedw. – r (3 samples in kv. 1, 2 in kv. 86), InW, submerged on sunked wood in rivers.

Funaria hygrometrica Hedw. – fqq, Ad, fire-places and along little-used roads in pine and birch forests; 2, 3.

Hamatocaulis vernicosus (Mitt.) Hedenдs – rr (2 samples in 12 sq.), Sw, mire with hypnalean mosses; on soil.

Helodium blandowii (F. Weber & D. Mohr) Warnst. – r (4 samples in kv. 12, 1 in kv. 41, 2 in kv. 94), Sw, mire with hypnalean mosses; on soil; 1, 3.

Herzogiella turfacea (Lindb.) Z. Iwats. – rr (1 sample in kv. 95), Nm, mixed forest with spruce and broad-leaved trees and their derivates; on rotten wood and at base of tree trunks; 3.

Homalia trichomanoides (Hedw.) Bruch. et al. – fq, Nm, flood-plain broad-leaved forests; on tree trunks and rotten wood; 2, 3.

Hygrohypnum luridum (Hedw.) Jenn. – r (3 samples in kv. 94; 2 – kv. 117), Sw, mires dominated by grasses and hypnalean mosses; on rotten wood, tree trunks, near springs, on soil.

Hypnum cupressiforme Hedw. – fqq, Nm, broad-leaved and birch-aspen forests; on tree trunks, Nm; 2, 3.

Hylocomium splendens (Hedw.) Bruch et al. – sp, Pn, mossy pine forests, mixed forests of spruce and broad-leaved trees; on soil and rotten wood; 1, 2, 3.

Leptobryum pyriforme (Hedw.) Wils. – fqq, Ad, flood-plain oak, aspen and alder forests; on soil; 2, 3.

Leptodictyum riparium (Hedw.) Warnst. – fq, Nt, wet to fresh and sometimes bushy flood-plain meadows; on soil; 3.

Leucobryum glaucum (Hedw.) Ångstr. – rr (2 samples in kv. 96; 1 in kv. 100), Br, mixed forest of spruce and broad-leaved trees and their derivates; on soil; 2, 3.

Leucodon sciuroides (Hedw.) Schwägr. – sp, Pn, pine forests; on tree trunks including their bases.

Mnium stellare Hedw. – fqq, Nm, flood-plain broad-leaved forests with scattered herbaceous layer, old roads in forest; on soil.

Neckera pennata Hedw. – sp, Nm, flood-plain broad-leaved and more rarely aspen forests; on tree trunks; 3.

Orthotrichum obtusifolium Brid. – fqq, Nm, flood-plain broad-leaved forests; on tree trunks; 2, 3.

O. speciosum Nees – fqq, Nm, flood-plain broad-leaved and more rarely aspen forests; on tree trunks; 2, 3.

Oxyrrhynchium hians (Hedw.) Loeske – sp, Nm, mixed spruce and broad-leaved forests; on tree trunks and soil; 2, 3.

Paludella squarrosa (Hedw.) Brid. **–** sp, Sw, mire with hypnalean mosses; on soil; 1.

Philonotis caespitosa Jur. – sp, Sw, mire with hypnalean mosses; on soil.

Plagiomnium affine (Blandow ex Funck) T.J. Kop. – r (5 samples in kv. 97), Pn, spruce forest with *Sphagna*, more rarely in mixed spruce and broad-leaved forest; on soil and rotten wood; 1, 2, 3.

P. cuspidatum (Hedw.) T.J. Kop. – fq, Nm, open oak forests, grassy-mossy birch forests, rarely flood-plain alder forests; on rotten wood.

**P. elatum* (Bruch et al.) T.J. Kop. – r (6 records in kv. 116 & 117), Nt, flood-plain alder forests; on soil; 3.

P. ellipticum (Brid.) T.J. Kop. – fq, Nm, flood-plain broad-leaved forests with open herbaceous layer; on soil.

P. medium (Bruch et al.) T.J. Kop. – fqq, Nt, oak forests and their derivates; on soil.

P. undulatum (Hedw.) T.J. Kop. – fqq, Nm, broad-leaved forests with open herbaceous layer; on soil; 2, 3.

Plagiothecium denticulatum (Hedw.) Bruch et al. – fq, Pn, pine forests with *Vaccinium vitis-idea*; on rotten wood and at base of tree trunks.

P. laetum Bruch et al. – sp, Pn, pine forests of *Vaccinium vitis-idea, V. myrtyllus,* and mossy types; on rotten wood, soil and tree trunks; 2, 3.

P. nemorale (Mitt.) A. Jaeger – fq, Nm, flood-plain broad-leaved forests; on rotten wood and tree trunk bases; 2, 3.

P. succulentum (Wils.) Lindb. – sp, Nm, wet broad-leaved, and spruce and broad-leaved forests; on rotten wood and tree trunk bases.

Platygyrium repens (Brid.) Bruch et al. – sp, Pn, flood-plain broad-leaved forests; on tree trunks.

Pleurozium schreberi (Brid.) Mitt. – fqq, Pn, pine forests

and their derivates; on soil and rotten wood; 1, 2, 3.

Pohlia cruda (Hedw.) Lindb. – sp, Pn, mossy pine forests; on rotten wood.

P. nutans (Hedw.) Lindb. – fqq, Pn, pine forests of herbaceous and *Vaccinium* types;on soil and rotten wood; 2, 3

**Polytrichastrum alpinum* (Hedw.) G.L. Sm. – r (7 records in kv. 94 and 101), Olg, mires and forests; on soil; 3. No one vaucher collection of this species was seen.

P. formosum (Hedw.) G.L. Sm. – sp, Pn, pine and birch forests; on soil.

**P. longisetum* (Sw.ex Brid.) G.L. Sm. – r (reported in 6 places in kv.116 and 57), Sw, grass and sedge-sphagnous mires; on soil, rotten wood, tree trunk bases; 1.

Polytrichum commune Hedw. – fqq, Pn, forest clear-cuttings, along forest roads, boggy pine forests, lake shores and creek banks; on soil; 1, 2, 3, 4.

P. juniperinum Hedw. – fqq, Pn, lichen pine forests, roadsides in forests, xeric slopes; on soil; 2, 3.

P. piliferum Hedw. – fqq, Pn, pine forests (*Cladonia* type, *Vaccinium vitis-idea* type), xeric slopes, sandy roadsides; on soil; 2.

P. strictum Brid. – fqq, Olg, mires dominated by grasses+sphagna, by hypnalean mosses, by pine; on soil; 1, 2.

Pseudobryum cinclidioides (Huebener) T.J. Kop. – sp, Nt, spruce-broad-leaved forests and their derivates; on soil; 3.

**Pseudocalliergon lycopodioides* (Brid.) Hedenäs – r (8 records in kv. 41 and 94), Sw, mires with hypnalean mosses; on soil; 1. No one vaucher collection of this species was seen.

Pseudoleskeella nervosa (Brid.) Nyholm – fqq, Nm, pine forests and rarely open oak forests; on soil and rocks.

Ptilium crista-castrensis (Hedw.) De Not. – sp, Pn, mossy pine forests and spruce–broad-leaved forests; on rotten wood and soil; 1, 2, 3.

Pylaisia polyantha (Hedw.) Bruch et al. – fqq, Nm, flood-plains broad-leaved forests; on tree trunks; 2, 3.

Rhizomnium punctatum (Hedw.) T.J. Kop. – sp, Sw, grassy-mossy birch forests; on rotten wood and soil; 2, 3.

Rhodobryum roseum (Hedw.) Limpr. – sp, Nm, oak and broad-leaved-pine forests; abandoned forest roads, on soil; 2, 3.

Rhytidiadelphus squarrosus (Hedw.) Warnst. – sp, Sw, fresh flood-plains, bushy post-forests meadows; on soil; 1, 2, 3.

R. triquetrus (Hedw.) Warnst. – sp, Nm, broad-leaved forests; on soil.

Sanionia uncinata (Hedw.) Loeske – fqq, Nm, flood-plain broad-leaved, oak, oak-pine, rarely birch and aspen forests; on soil, tree trunks and rotten wood; 1, 2, 3.

Sciuro-hypnum populeum (Hedw.) Ignatov & Huttunen – sp, Nm, broad-leaved forests; on rotten wood and soil; 2, 3.

S. reflexum (Starke) Ignatov & Huttunen – fqq, Nm, flood-plains broad-leaved forests; on rotten wood and soil; 2, 3.

S. starkei (Brid.) Ignatov & Huttunen – sp, Nm, flood-plains broad-leaved forests; on soil and rotten wood.

Serpoleskea subtilis (Hedw.) Loeske – fq, Pn, herbaceous pine forests, grassy-mossy birch forests; on tree trunks; 2, 3.

Sphagnum angustifolium (C.E.O. Jensen ex Russow) C.E.O. Jensen – sp, Olg, sphagnous and grassy-sphagnous mires; open boggy pine and birch forests; on soil; 1, 2, 3, 4.

S. balticum (Russ.) C.E.O. Jensen – r (2 samples in kv. 116; 3 in117 sq.), Sw, sphagnous, more rarely grassy-sphagnous mires; on soil; 1.

S. capillifolium (Ehrh.) Hedw. – sp, Sw, mires with alder, with hypnalean mosses, pine-sphagnous bogs, boggy pine and birch forests; on soil; 1, 2, 4.

S. centrale C.E.O. Jensen – sp, Nt, swampy birch and alder forests, rarely grassy mires with hypnalean mosses; on soil and at tree bases.

S. cuspidatum Ehrh. ex Hoffm. – sp, Sw, grassy-sphagnous mires; alder and birch swamps; on soil; 1, 2, 4.

S. fallax (H. Klinggr.) H. Klinggr. – fq, Sw, grassy, grassy-sphagnous, sphagnous, and alder mires, bogging old forest roads; on soil; 2, 4.

S. fimbriatum Wils. – sp, Olg, sphagnous and pine-sphagnous mires, rarely mires with hypnalean mosses; on soil; 1, 2, 4.

S. flexuosum Dozy et Molk. – fqq, Sw, grassy-sphagnous, sphagnous, and alder mires; bogging roadsides in forest; on soil; 2, 3, 4.

S. girgensohnii Russow – r (3 samples in kv. 33, 3 in kv. 40; 1 in kv. 78; 2 in kv. 83), Sw, alder and hypnalean mires, rarely grassy-sphagnous mires and wet spruce-sphagnous forests; on soil; 2, 4.

S. jensenii H. Lindb. – rr (1 samples in kv. 57; 1 in kv.116), Sw, sphagnous mires, swampy birch forests; on soil; 2, 4.

S. magellanicum Brid. – fqq, Olg, sphagnous and pine-sphagnous bogs; on soil and at tree bases; 2, 3, 4.

S. majus (Russow) C.E.O. Jensen – sp, Sw, sphagnous, grassy-sphagnous mires, rarely swampy meadows; on soil; 2, 3, 4.

S. obtusum Warnst. – r (2 samples in kv. 40; 3 in kv. 57; 1 in kv. 97), Nt, alder, rarely pine-sphagnous and sphagnous mires; on soil; 1, 2, 3, 4.

S. palustre L. – sp, Sw, grassy-sphagnous and alder, rarely sphagnous and hypnalean mires; on soil; 1, 2, 4.

S. platyphyllum (Lindb. ex Braithw.) Warnst. – sp, Sw, sphagnous and grassy-sphagnous mires; on soil; 2, 4.

S. riparium Ångstr. – sp, Sw, grassy-sphagnous and pine mires; on soil; 2, 4.

S. russowii Warnst. – r (4 samples in kv. 11, 1 in kv. 81), Sw, mires with sphagna, with grasses+sphagna, with hypnalean mosses; on soil; 1, 2, 4.
S. squarrosum Crome – fqq, Nt, mires with alder, with hypnalean mosses, rarely swampy ash forests; on soil; 1, 2, 4.
S. subsecundum Nees – fqq, Sw, sphagnous, and more rarely grassy-sphagnous mires and mires dominated by hypnalean mosses; on soil; 1. 2, 4,
S. teres (Schimp.) Ångstr. ex Hartm.– r (5 samples in kv. 40; 2 in kv. 117), Sw, alder swamps, mires with hypnalean mosses, boggy pine-birch communities; on soil; 1, 2, 4.
S. warnstorfii Russow – sp, Sw, mires dominated by hypnalean mosses, more rarely with pine, pine and birch, and grassy-sphagnous types; on soil; 1, 2, 4.
Straminergon stramineum (Dicks. ex Brid.) Hedenäs – sp, Sw, flood-plain meadows, edges of grassy-sphagnous mires; on soil.
Tetraphis pellucida Hedw. – fqq, Nm, flood-plain broad-leaved, and more rarely pine-birch and swampy alder forests; on rotten wood; 1, 2, 3.
Tomenthypnum nitens (Hedw.) Loeske – sp, Sw, mires with hypnalean mosses and its combinations with shrubby and grassy comunities; on soil; 1.
Thuidium delicatulum (Hedw.) Bruch et al. – sp, Nm, open oak, and pine + broad-leaved forests; on soil.
Warnstorfia exannulata (Bruch et al.) Loeske. – fqq, Pn, grassy-sedge mires; on rotten wood and soil; 1.
W. fluitans (Hedw.) Loeske – fqq, Sw, grassy-sedge mires; on soil; 1.

Hepaticae

Ptilidium pulcherrimum (G. Web) Vain. – sp, Nm, flood-plain broad-leaved forests; on rotten wood and tree trunks.
Radula complanata (L.) Dum. – sp, Nm, broad-leaved and mixed, more rarely pine-birch forests; on tree trunks; 3.
Marchantia polymorpha L. – fq, Nm, broad-leaved and oak-pine forests with scattered herbs; on soil; 1, 2, 3.

Results and Discussion

The bryoflora of the reserve includes 67 genera, 121 species, of Bryopsida (118 species) and Hepaticopsida (3 species). It comprises 75.8% of the known species diversity of Bryansk Province (Anishchenko; 2006).

The most multispecious genus is *Sphagnum* with 21 species. *Dicranum* and *Plagiomnium* include 6 species, *Brachythecium* – 5, *Polytrichum* and *Plagiothecium* – 4. This proportion is similar to that of e.g. of the National Park "Orlovskoye Polessye" (Obyedkova; 2006), and is characteristic for the forest zone of the East Europe.

Forest mosses (epiphytic, epixylic, and epigeios in forest) include 66 species, mire mosses – 24 species. The least diverse is the group meadow's mosses – 10 species.

The epiphytic mosses are more characteristic to broad-leaved forests: *Anomodon longifolius*, *A. viticulosus*, **Dicranum viride*, **Homalia trichomanoides*, *Hypnum cupressiforme*, **Neckera pennata*, *Orthotrichum obtusifolium*, *O. speciosum*. Some of them (marked by asterisk*) are used as an indicators of old-aged broad-leaved forests of the class Querco-Fagetea, the order Fagetalia sylvaticae, the alliance Querco roboris-Tilion cordatae.

The boreal species occur on soil in pine and spruce forests and their derivates: *Dicranum scoparium*, *D. polysetum*, *Hylocomium splendens*, *Pleurozium schreberi*, *Ptilium crista-castrensis*, *Callicladium haldanianum*, etc. Most of mosses in forest habitats grow on soil which is similar to bryoflora of some boreal regions of Russia (Vyunova; 1980; Vorobyov; 1983, Muldiyarov; 1990; Belkina; 1989; Shubina & Zheleznova; 2002).

Some northern mosses grow mostly in wet places, mostly mires: *Aulacomnium palustre*, *Drepanocladus aduncus*, *Tomenthypnum nitens*, *Hamatocaulis vernicosus*, *Paludella squarrosa, Sphagnum* spp., etc. Many of them are rare due to rarity of their habitats and stenotopy: *Sphagnum balticum*, *S. jensenii*, *Polytrichastrum longisetum*, *Dicranum bonjeanii*, *Cratoneuron filicinum*, etc.

The bryoflora of the reserve includes a number of widespread or cosmopolitan species: *Ceratodon purpureus*, *Bryum argenteum*, *B. caespiticium*, *Funaria hygrometrica*, *Leptobryum pyriforme*. At the same time, *Leucobryum glaucum*, *Buxbaumia aphylla*, *Tomenthypnum nitens* occur here at the border of their ranges.

Bioecogroups segregated according to Smirnova et al. (2004) include:
— nemoral group (41 species), e.g. *Anomodon longifolius*, *A. viticulosus*, *Brachytheciastrum velutinum*, etc.;
— mesotrophic swamps (32 species) – *Cratoneuron filicinum, Aulacomnium palustre*, etc.;
— pine forest group (21 species) – *Hylocomium splendens*, *Leucodon sciuroides,* etc.;
— aquatic group includes only *Fontinalis antipyretica*;
— *Leucobryum glaucum* is the only representative of boreal group;

— dry meadow group inlcudes *Abietinella abietina and Brachythecium albicans;*
— fresh meadow group includes *Brachythecium mildeanum, Calliergonella cuspidata, Calliergon cordifolium.*

The segregation of these bioecogroups is helpful for the study of horizontal mosaic pattern in plant communities.

The territory of the reserve includes 3 species listed in the Red Data Book of European Bryophytes (1995): *Neckera pennata*, *Herzogiella turfacea*, *Buxbaumia aphylla*.

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