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RESEARCH ARTICLE

Epiphytic bryophyte communities of the Dendrological Park “Olexandria” of the NAS of Ukraine

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Abstract

The article presents the results of research on epiphytic bryophyte communities of the Dendrological Park “Olexandria”. The study was conducted in the historical part of the arboretum in 2021. Among the investigated phorophytes were the following tree species: *Acer platanoides*, *A. pseudoplatanus*, *Betula pendula*, *Carpinus betulus*, *Fraxinus excelsior*, *Quercus robur*, *Populus* sp., *Salix babylonica*, and some others.

The research results showed that the epiphytic bryophyte vegetation of the historical part of the Dendrological Park “Olexandria” is represented by two unranked communities and 11 associations belonging to six unions, four orders, and three classes. The most widespread in the arboretum are the associations *Dicrano scoparii-Hypnetum filiformis*, *Platygyrietum repentis*, *Leskeetum polycarpae*, and the rankless community *Leucodon sciuroides* of the class *Frullanio dilatatae-Leucodontetea sciuroidis*.

It is shown that in terms of the number of detected bryophyte associations, the Dendrological Park “Olexandria” is similar to the National Nature Park “Homilsha Woods”, which is located in the Kharkiv region (hosts 11 reported associations) and the Nature Reserve “Kanivskyi” in the Cherkasy region (12 reported associations). However, it is poorer than the National Nature Park “Holosiivskyi” in Kyiv, where 16 bryoassociations were registered.

Keywords: epiphytic bryophyte communities, phorophyte, bryoassociations, Dendrological Park “Olexandria”

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Introduction

Bryophytes are an integral component in most ecosystems, forming fairly stable communities. Bryophyte communities are the basis of the moss cover and its structural elementary unit, which exists in nature and

can be classified. Currently, two approaches to classifying moss communities are known (Gapon, 2004). In the first approach, the bryogroups are considered synuses (a component of the horizontal structure of phytocenoses), which are an element of the general classification of vegetation.

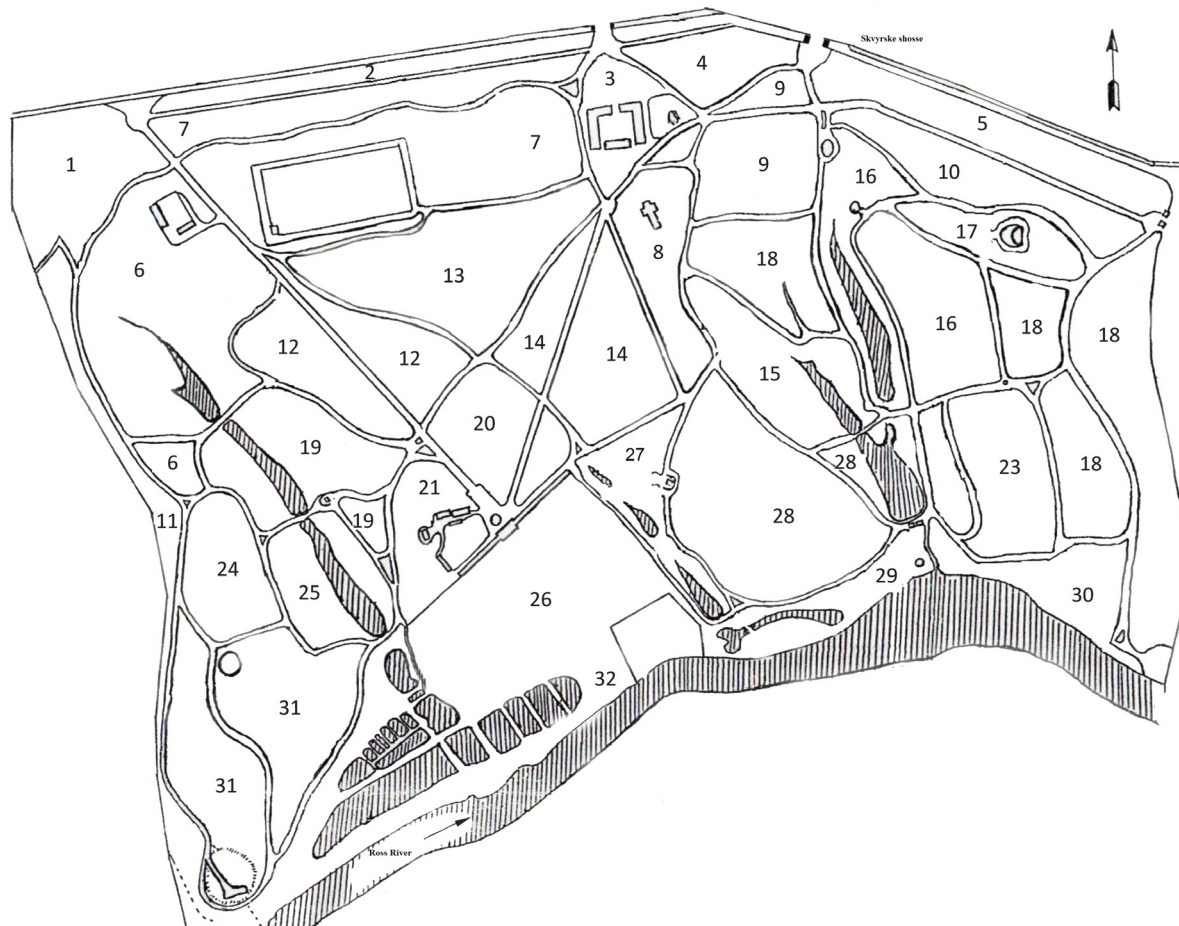


Figure 1. The historical part of the Dendrological Park “Olexandria”. Numbers indicate the arboretum sections.

Investigation of moss synuses in Ukraine was carried by such bryologists as Ulychna (1958, 1980), Partyka (1966), and Boyko (1978).

According to the second approach, moss communities are considered independent coenoses classified independently from the associations of higher vascular plants. Still, they are classified according to the ecological and vegetation principles using the Brown-Blanquet method. The study and classification of bryophyte vegetation by the Brown-Blanquet method began in Ukraine only at the end of the 20th century (Gapon et al., 1998). Information about the bryophyte vegetation of the forest-steppe part of Ukraine is presented in a number of publications by Poltava bryologists Svitlana and Yurii Gapon (Gapon 2007a, 2007b, 2009, 2012a, 2012b, 2015, 2017; Gapon & Gapon, 2018).

An article on epiphytic and epixylic bryogroups of the National Nature Park “Holosiivskiyi” appeared recently (Onyshchenko & Virchenko, 2020). The

bryocommunities of the Dendrological Park “Oleksandria” remained unstudied until yet. At the same time, this task was relevant because the diversity of tree species combined with humid habitats make the arboretum a perfect model object for studying epiphytic moss communities.

Material and methods

In 2021, we conducted research to study the epiphytic bryophyte communities in the localities of the historical part of the Dendrological Park “Olexandria” (Fig. 1).

The moss communities were examined on the following phorophytes: *Acer platanoides* L., *A. pseudoplatanus* L., *Betula pendula* Roth, *Carpinus betulus* L., *Fraxinus excelsior* L., *Quercus robur* L., *Populus* sp., *Salix babylonica* L. and some other. Description of moss communities on experimental phorophytes was carried

Table 1. Synoptic table of epiphytic bryocommunities of the Dendrological Park "Olexandria" at the level of orders (constancy of species in %).

Syntaxon	Orthotrichetalia	Dicranetalia scoparii	Neckeretalia complanatae
Number of descriptions	16	18	6
<i>Leucodon sciuroides</i>	50	.	17
<i>Nyholmiella obtusifolia</i>	25	.	.
<i>Orthotrichum pumilum</i>	19	.	.
<i>Lewinskya speciosa</i>	25	11	.
<i>Pylaisia polyantha</i>	25	.	.
<i>Ptychostomum moravicum</i>	.	22	.
<i>Hypnum cupressiforme</i>	25	78	17
<i>Jochenia pallescens</i>	.	28	.
<i>Platygyrium repens</i>	19	89	.
<i>Pseudanomodon attenuatus</i>	.	.	33
<i>Anomodon longifolius</i>	.	.	33
<i>Anomodon viticulosus</i>	.	.	50
<i>Homalia trichomanoides</i>	.	.	17
<i>Leskea polycarpa</i>	63	.	50
<i>Dicranum montanum</i>	.	17	.
<i>Orthotrichum patens</i>	13	.	.
<i>Pylaisia polyantha</i>	.	6	.
<i>Radula complanata</i>	6	.	17
<i>Syntrichia virescens</i>	6	.	.
<i>Porella platyphylla</i>	13	.	17
<i>Amblystegium serpens</i>	.	6	.
<i>Ptychostomum moravicum</i>	6	.	.
<i>Brachythecium salebrosum</i>	.	.	17
<i>Pseudoleskeella nervosa</i>	16	.	33
<i>Sciuro-hypnum curtum</i>	.	6	.
<i>Dicranum scoparium</i>	.	6	.
<i>Pseudoleskeella nervosa</i>	.	11	.

out using 10×40 cm plots, while the coordinates of the point, exposure, angle of inclination of the tree trunk, and height from the soil surface were recorded. In total, 47 such descriptions were made. The bryophyte associations names are provided according to [Marstaller \(2006\)](#), and higher syntaxonomy follows [Mucina et al. \(2016\)](#). The bryophyte taxonomy follows the recent checklist of [Hodgetts et al. \(2020\)](#).

Results and discussion

The research results revealed that the epiphytic bryophyte vegetation of the historical part of the Dendrological Park "Olexandria" is represented by two unranked groups and 11 associations belonging to six unions, four orders, and three classes. The constancy of observed species in orders is shown in [Table 1](#).

Prodromus of epiphytic bryophyte vegetation of the Dendrological Park "Olexandria"

Class *Frullanio dilatatae-Leucodontetea sciuroidis* Mohan 1978

Order *Orthotrichetalia* Hadač in Klika & Hadač 1944

[unranked community] *Leucodon sciuroides*

Union *Leskeion polycarpae* Barkman 1958

Leskeetum polycarpae Horvat 1932

Union *Ulotion crispae* Ochsner 1928

Pylaisietum polyanthae Gams ex Felföldy 1941

Union *Syntrichion laevipilae* Ochsner 1928

Orthotrichetum fallacis von Krusenstjerna 1945

Orthotrichetum speciosi (Jäggli 1934)

Barkman 1958

Syntrichio laevipilae-Orthotrichetum

obtusifolii Allorge 1922 em. Barkman 1958

Order *Dicranetalia scoparii* Barkman 1958

Union *Dicrano scoparii-Hypnion filiformis*

Barkman 1958

Platygyrietum repentis LeBlank ex

Marstaller 1986

Ptilidio pulcherrimi-Hypnetum

pallescentis Herzog 1943

Dicrano scoparii-Hypnetum filiformis

Barkman 1949

Class *Cladonio digitatae-Lepidozietea reptantis* Ježek & Vondráček 1962

Order *Brachythecietalia rutabulo-salebrosi*

Marstaller 1987

Union *Bryo capillaris-Brachythecion*

rutabuli Lecointe 1975

Class *Neckeretea complanatae* Marstaller 1986

Order *Neckeretalia complanatae* Ježek &

Vondráček 1962

Union *Neckerion complanatae* Šmarda &

Hadač ex Klika 1946

Anomodontetum attenuati (Barkman 1958)

Peciar 1965

Anomodontetum longifolii Waldheim 1944

[unranked community] *Anomodon*

viticulosus

Plagiomnio cuspidati-Homalietum

trichomanoidis (Peciar 1965) Marstaller

The class *Frullanio dilatatae-Leucodontetea sciuroidis* unites mostly epiphytic moss communities developing on the bark of living trees. Groups of the order *Orthotrichetalia* (described in Table 2) consist of heliophytic mesophytic and mesoxerophytic species

growing on trees with a neutral or alkaline bark reaction. Characteristic and dominant species of five associations of this order are *Leskea polycarpa* Hedw., *Pylaisia polyantha* (Hedw.) Schimp., and species of the genus *Orthotrichum* Hedw. s.l. These communities occur on such tree species as *Salix babylonica*, *Populus* sp., *Fraxinus excelsior*, and *Acer platanoides*. The unranked community *Leucodon sciuroides* (Hedw.) Schwagr. also develops on maples and ash trees, less often on oaks.

Communities of the order *Dicranetalia scoparii* (described in Table 3) are confined to trees with an acidic bark reaction or dead. Investigation showed that mosses *Jochenia pallescens* (Hedw.) P. Beauv., *Hypnum cupressiforme* Hedw., *Platygyrium repens* (Brid.) Schimp., and *Dicranum montanum* Hedw. are characteristic and dominant species for three associations of this order. These communities occur on such tree species as *Betula pendula* and *Quercus robur*.

The class *Cladonio digitatae-Lepidozietea reptantis* (described in Table 4) comprises only one order *Brachythecietalia rutabulo-salebrosi*, with one union *Bryo capillaris-Brachythecion rutabuli*. *Brachythecium salebrosum* (Hoffm. ex F. Weber et D. Mohr) Schimp. is the characteristic and dominant species of the mentioned class and order. It was registered on *Betula pendula* and *Quercus robur*. The class generally includes epixylic groups, which are out of the scope of our current investigation. From this class, the association *Brachythecio salebrosi-Amblystegietum juratzkani* (Marstaller, 1987) with the characteristic species *Amblystegium serpens* (Hedw.) Schimp. can be identified in the arboretum. It was also discovered in the National Nature Park "Holosiivskiy" (Onyshchenko & Virchenko, 2020).

The class *Neckeretea complanatae* (described in Table 4) includes relatively large sciaphilic mosses growing on the substrates with a neutral or alkaline reaction. Such mosses as *Pseudanomodon attenuatus* (Hedw.) Huebener, *Anomodon longifolius* (Schleich. ex Brid.) Hartm., and *Homalia trichomanoides* (Hedw.) Brid. are characteristic and dominant species of three associations of the order *Neckeretalia complanatae*. These communities were discovered in the arboretum on the bark of *Fraxinus excelsior* and *Quercus petraea*

Table 2. Descriptions of the order *Orthotrichetalia* and unidentified descriptions of the class *Frullanio dilatatae-Leucodontetea sciuroidis*.

Nr in the table	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Nr in the database	8501	8502	8506	8522	8523	8517	8505	8508	8509	8527	8507	8492	8493	8495	8503	8526	8496	8494	8531
Field Nr	15	16	20	35	36	31	19	22	23	40	21	6	7	9	17	39	10	8	90
Exposition	N	NE	W	N	N	SW	W	SW	SW	N	NE	E	E	N	NE	SE	N	N	SW
Steepness	85	80	75	90	90	70	75	90	90	80	85	75	70	87	80	87	87	87	90
Year	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021
Month	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Day	19	19	19	20	20	20	19	19	19	20	19	19	19	19	19	20	19	19	20
Tree species	<i>Acer platanoides</i>	<i>Fraxinus excelsior</i>	<i>Populus</i> sp.	<i>Salix babylonica</i>	<i>Salix babylonica</i>	<i>Acer pseudoplatanus</i>	<i>Populus</i> sp.	<i>Populus</i> sp.	<i>Populus</i> sp.	<i>Carpinus betulus</i>	<i>Populus</i> sp.	<i>Quercus robur</i>	<i>Quercus robur</i>	<i>Quercus robur</i>	<i>Fraxinus excelsior</i>	<i>Fraxinus excelsior</i>	<i>Quercus robur</i>	<i>Quercus robur</i>	<i>Acer platanoides</i>
Height above ground, cm	30	118	10	60	60	112	116	112	5	115	75	130	125	110	100	95	140	10	93
Latitude, °	49.78555	49.81222	49.80416	49.81305	49.81305	49.81250	49.80417	49.80417	49.80806	49.81556	49.80417	49.81444	49.81444	49.81444	49.81222	49.81556	49.81444	49.78556	49.81250
Longitude, °	30.09472	30.07528	30.06722	30.07944	30.07944	30.07833	30.06722	30.07528	30.07722	30.07778	30.07528	30.04861	30.04861	30.04861	30.07528	30.07778	30.04861	30.09472	30.07833
Number of bryophytes species	4	4	2	2	2	7	3	1	3	5	3	2	2	2	4	2	3	2	4
Bryophytes cover, %	80	95	80	70	60	90	60	80	70	40	50	65	70	60	90	85	50	60	50
Syntaxon	1	1	1	1	1	2	3	3	4	5	5	6	6	6	6	6	7	7	7

Notes. Syntaxa numbers: **1** – *Leskeetum polycarpae*, **2** – *Pylaisietum polyanthae*, **3** – *Syntrichio laevipilae-Orthotrichetum obtusifolii*, **4** – *Orthotrichetum fallacis*, **5** – *Orthotrichetum speciosi*, **6** – com. *Leucodon sciuroides*, **7** – *Frullanio dilatatae-Leucodontetea sciuroidis*.

Table 2. Continued.

Nr in the table	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Ch Leskeion polycarpae																			
<i>Leskea polycarpa</i>	65	87	75	65	40	20	.	.	3	3	.	.	.	.	5	10	.	.	3
Ch Ulotion crispae																			
<i>Pylaisia polyantha</i>	.	.	.	5	20	60	.	.	.	2	.	.	.	.	.	.	.	.	.
Ch Syntrichion laevipilae																			
<i>Nyholmia obtusifolia</i>	.	.	.	.	.	10	55	80	2	.	.	.	.	.	.	.	.	.	.
<i>Orthotrichum pumilum</i>	.	.	5	.	.	.	3	.	65	.	.	.	.	.	.	.	.	.	2
<i>Lewinskya speciosa</i>	.	.	.	.	.	+	2	.	.	20	45	.	.	.	.	.	.	.	.
<i>Leucodon sciuroides</i>	7	.	.	.	.	+	.	.	.	.	1	60	67	59	80	75	15	.	.
<i>Syntrichia virescens</i>	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ch Frullanio dilatatae- Leucodontetea sciuroidis																			
<i>Frullania dilatata</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Orthotrichum patens</i>	7	.	.	.	.	.	.	.	.	10	.	.	.	.	.	.	.	.	.
<i>Radula complanata</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	40	.
<i>Syntrichia papillosa</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25
Ch Dicranetalia scoparii																			
<i>Hypnum cupressiforme</i>	.	.	.	.	.	+	.	.	.	.	.	5	3	.	3	.	.	.	.
<i>Platygyrium repens</i>	1	.	.	.	.	+	.	.	.	.	4	.	.	.	.	.	5	.	.
Ch Neckeretea complanatae																			
<i>Porella platyphylla</i>	.	3	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.
Other species of bryophytes																			
<i>Amblystegium serpens</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20	.
<i>Ptychostomum moravicum</i>	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Pseudoleskeella nervosa</i>	.	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	20
Lichens																			
<i>Lepraria incana</i>	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	+	.
<i>Evernia prunastri</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 3. Descriptions of the order *Dicranetalia scoparii*.

Nr in the table	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Nr in the database	8487	8489	8491	8514	8497	8515	8524	8525	8518	8520	8488	8490	8498	8512	8513	8519	8521	8511
Field Nr	1	3	5	28	11	29	37	38	32	34	2	4	12	26	27	33	35	25
Exposition	N	NNE	NW	N	NNE	W	NW	W	NW	E	N	NNE	N	SE	NW	NW	E	SE
Steepness	85	80	75	87	88	90	70	85	87	70	85	80	88	85	85	87	70	85
Year	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021
Month	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Day	19	19	19	20	19	20	20	20	20	20	19	19	19	20	20	20	20	20
Tree species	<i>Quercus robur</i>	<i>Quercus robur</i>	<i>Quercus robur</i>	<i>Betula pendula</i>	<i>Quercus robur</i>	<i>Betula pendula</i>	<i>Betula pendula</i>	<i>Betula pendula</i>	<i>Betula pendula</i>	<i>Betula pendula</i>	<i>Quercus robur</i>	<i>Quercus robur</i>	<i>Quercus robur</i>	<i>Quercus robur</i>	<i>Betula pendula</i>	<i>Betula pendula</i>	<i>Betula pendula</i>	<i>Betula pendula</i>
Height above ground, cm	30	20	20	2	10	20	5	94	40	20	130	120	127	122	5	85	70	70
Latitude, °	49.78556	49.80417	49.81444	49.80417	49.81444	49.80417	49.81389	49.81306	49.81306	49.81306	49.78556	49.80417	49.81444	49.80417	49.81250	49.81306	49.81306	49.80417
Longitude, °	30.04861	30.04861	30.07528	30.07528	30.04861	30.07750	30.07528	30.07944	30.07944	30.07944	30.04861	30.04861	30.04861	30.07222	30.07833	30.07944	30.07944	30.07222
Number of bryophytes species	3	2	2	4	4	3	2	5	2	4	2	2	3	2	2	1	5	2
Bryophytes cover, %	90	95	90	80	95	90	95	80	80	60	60	60	70	90	80	70	85	40
Syntaxon	1	1	1	1	1	2	2	2	3	3	4	4	4	4	4	4	4	4

Notes. Syntaxa numbers: **1** – *Dicrano scoparii*-*Hypnetum filiformis*, **2** – *Ptilidio pulcherrimi*-*Hypnetum pallescentis*, **3** – crossing of *Ptilidio pulcherrimi*-*Hypnetum pallescentis* × *Platygyrietum repentis*, **4** – *Platygyrietum repentis*.

Table 3. Continued.

Nr in the table	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Ch <i>Dicrano scoparii-</i> <i>Hymion filiformis</i>	80	93	87	50	90	6	15	3	.	5	3	10	7	30	.	.	3	.
<i>Hymnum cupressiforme</i>	80	80	60	50	40	.	.	.	.	.	.	.	.
<i>Jochenia pallescens</i>	7	.	3	20	1	4	.	10	30	40	57	50	60	60	79	70	60	37
<i>Platygyrium repens</i>	2	.	.	.	.	.	.	1	.	.	3
<i>Dicranum montanum</i>
Ch <i>Frullanio dilatatae-</i> <i>Leucodontetea sciuroidis</i>
<i>Pylaisia polyantha</i>	20	.
<i>Lewinskya speciosa</i>	5	.	.	.	.	.	.	1	.
Ch <i>Neckeretea complanatae</i>
<i>Amblystegium serpens</i>	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Ch <i>Frullanio dilatatae-</i> <i>Leucodontetea sciuroidis</i>
<i>Sciuro-hypnum curtum</i>	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other species of bryophytes
<i>Ptychostomum moravicum</i>	3	2	.	.	3	.	.	.	.	.	.	.	3	.	.	.	.	.
<i>Dicranum scoparium</i>	5	.	.	.	.	.	.	.	.	1	.
<i>Pseudoleskeella nervosa</i>	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lichens
<i>Evernia prunastri</i>	+	+	+
<i>Lepraria incana</i>	.	.	+	+	+	+
<i>Parmelia sulcata</i>	+	+	+

Table 4. Descriptions of the classes *Neckeretea complanatae*, *Cladonio digitatae-Lepidozietea reptantis*, and unidentified descriptions.

Nr in the table	1	2	3	4	5	6	7	8	9	10	11
Nr in the database	8534	8529	8530	8528	8532	8533	8516	8504	8499	8500	8510
Field Nr	47	42	43	41	45	46	30	18	13	14	24
Exposition	N	NW	NW	SE	N	N	NW	NE	N	NNE	SE
Steepness	80	87	87	85	90	80	87	80	83	75	65
Year	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021
Month	8	8	8	8	8	8	8	8	8	8	8
Day	21	20	20	20	20	21	20	19	19	19	20
Tree species	Quercus sp.	Fraxinus excelsior	Fraxinus excelsior	Fraxinus excelsior	Fraxinus excelsior	Quercus sp.	Betula pendula	Fraxinus excelsior	Quercus robur	Quercus robur	Betula pendula
Height above ground, cm	40	5	60	30	109	20	0	125	13	5	2
Latitude, °	49.81250	49.81250	49.81250	49.81250	49.81250	49.81250	49.80417	49.81222	49.81444	49.81444	49.81056
Longitude, °	30.07833	30.07833	30.07833	30.07833	30.07833	30.07833	30.07528	30.07528	30.04861	30.04861	30.07833
Number of bryophyte species	4	1	4	2	3	4	2	3	3	3	2
Bryophytes cover, %	95	95	90	90	90	90	60	80	50	98	30
Syntaxon	1	2	2	3	3	4	5	6	6	6	6
Ch Neckeretea complanatae											
<i>Pseudanomodon attenuatus</i>	89	.	.	.	.	20	.	.	.	.	.
<i>Anomodon longifolius</i>	.	95	65	.	.	.	.	.	.	.	.
<i>Anomodon viticulosus</i>	.	.	8	75	80	.	.	.	.	.	.
<i>Homalia trichomanoides</i>	.	.	.	.	.	60	.	.	.	.	.
<i>Porella platyphylla</i>	.	.	2	.	.	.	.	50	.	.	.
<i>Pseudoamblystegium subtile</i>	.	.	.	.	.	.	.	.	40	.	.
Ch Cladonio digitatae-Lepidozietea reptantis											
<i>Brachythecium salebrosum</i>	5	.	.	.	.	.	55	.	.	.	.
<i>Amblystegium serpens</i>	.	.	.	.	.	.	.	.	.	60	.

Notes. Syntaxa numbers: **1** – *Anomodontetum attenuati*, **2** – *Anomodontetum longifolii*, **3** – com. *Anomodon viticulosus*, **4** – *Plagiomnio cuspidati-Homalietum trichomanoidis*, **5** – *Bryo capillaris-Brachythecion rutabuli*, **6** – unidentified descriptions.

Table 4. Continued.

Nr in the table	1	2	3	4	5	6	7	8	9	10	11
Ch <i>Frullanio dilatatae</i>-<i>Leucodontetea sciuroidis</i>											
<i>Hypnum cupressiforme</i>	.	.	.	.	.	10	.	.	6	30	.
<i>Leskea polycarpa</i>	.	.	15	15	3	.	.	20	.	.	.
<i>Leucodon sciuroides</i>	.	.	.	.	7	.	.	10	.	.	.
<i>Platygyrium repens</i>	.	.	.	.	.	.	5	.	4	8	5
<i>Radula complanata</i>	1	.	.	.	.	.	.	.	.	.	.
Other species of bryophytes											
<i>Ptychostomum moravicum</i>	.	.	.	.	.	.	.	.	.	.	25
<i>Pseudoleskeella nervosa</i>	1	.	.	.	.	1	.	.	.	.	.

trees. The unranked community *Anomodon viticulosus* (Hedw.) Hook et Taylor was registered on the same phorophytes. In the Dendrological Park “Olexandria”, communities of this class occur less often compared to those of previously mentioned classes; they are more spread into the old trees and more humid ecotopes on the slopes of the ravines. In some places of the arboretum, especially on a plateau, the drying up of *Anomodon* Hook et Taylor s.l. species has been noted, which leads to the degradation of these communities.

In terms of the number of detected moss associations, the Dendrological Park “Olexandria” is similar to the National Nature Park “Homilsha Woods” in the Kharkiv region, where 11 moss associations were found (Gapon, 2012a) and the Kanivskyi Nature Reserve in the Cherkasy region, were observed 12 associations (Gapon, 2012b), but poorer than the “Hosiivskyi” National Nature Park in Kyiv, where 16 bryoassociations were registered (Onyshchenko & Virchenko, 2020).

We believe that communities of the class *Cladonio digitatae-Lepidozietea reptantis*, which mainly develop on dead wood and epilithic mossy vegetation, deserve further research in the Dendrological Park “Olexandria”. The syntaxonomic affiliation of the expansive epiphytic mosses *Dicranum tauricum* Sap. and *Syntrichia papillosa* (Wills.) Jur., which have been spreading on tree trunks in the natural forests of Ukraine in recent decades (Virchenko, 2011) and were discovered on the territory of Dendrological Park “Olexandria” also require a separate study (Virchenko & Pleskach, 2020).

Conclusions

Results of the investigations showed that the epiphytic bryophyte vegetation of the historical part of the Dendrological Park “Olexandria” is represented by two unranked communities and 11 associations that belong to six unions, four orders, and three classes.

The most widespread in the arboretum are the associations *Dicrano scoparii-Hypnetum filiformis*, *Platygyrietum repentis*, *Leskeetum polycarpae*, and the unranked community *Leucodon sciuroides* of the class *Frullanio dilatatae-Leucodontetea sciuroidis*. Communities of the class *Neckeretea complanatae* (*Anomodontetum attenuati*, *Anomodontetum longifolii*, *Plagiomnio cuspidati-Homalietum trichomanoidis*, and unranked community *Anomodon viticulosus*) occur less frequently in the Dendrological Park “Olexandria” and tend to more humid ecotopes.

References

- Boyko, M.F. (1978). About bryophyte synuses. *Ukrainian Botanical Journal*, 35(1), 87–92. (In Ukrainian)
- Gapon, S.V. & Gapon Y.V. (2018). Modern classification scheme of moss vegetation of Ukraine. *Biology and Ecology*, 4(1), 17–26. (In Ukrainian)
- Gapon, S.V. (2004). The state of study of moss vegetation in Ukraine and features of its classification. *Ukrainian Botanical Journal*, 61(2), 60–67. (In Ukrainian)

- Gapon, S.V. (2007a).** Mosses of the Dykanskiy Regional Landscape Park and their participation in the formation of bryocommunities. *Ukrainian Botanical Journal*, 64(2), 247–257. (In Ukrainian)
- Gapon, S.V. (2007b, May 24–26).** The modern state of moss vegetation research in the Forest-Steppe of Ukraine, its classification and prospects. In S.V. Shmaley (Ed.), *Proceedings of V International Conference "Falzfein's readings"* (pp. 54–55). PP Vyshemyrskiy, Kherson. (In Ukrainian)
- Gapon, S.V. (2009).** Epiphytic bryocommunities of the Chornoliskyi Landscape Reserve (Kirovohrad region). *Ukrainian Botanical Journal*, 66(4), 477–488. (In Ukrainian)
- Gapon, S.V. (2012a).** Bryoflora and moss vegetation of national natural parks of the Forest-Steppe of Ukraine. *Chornomorskyi Botanical Journal*, 8(2), 214–221. (In Ukrainian)
- Gapon, S.V. (2012b).** Nature-protected objects as centers of preservation of the bryodiversity in the conditions of the Forest-Steppe of Ukraine. *Biology and Ecology*, 3(1–2), 14–19. (In Ukrainian)
- Gapon, S.V., Solomakha V.A., & Sirenko I.P. (1998).** Epiphytic communities of bryophytes of Parasotske forest massif (Poltava region). *Ukrainian Phytocoenological Journal*, 1(9), 120–126. (In Ukrainian)
- Gapon, Y.V. (2015).** Mossy and bryophyte vegetation of the forest massifs of the "Nizhnyosulskyi" NNP (Poltava region). *Proceedings of Problems of Biology and Medicine*, 4(2), 71–73. (In Ukrainian)
- Gapon, Y.V. (2017).** Mossy vegetation of cities of Romen-Poltava Geobotanical district. *Proceedings of Problems of Biology and Medicine*, 3(1), 76–81. (In Ukrainian)
- Hodgetts, N.G., Soderstrom L., Blockeel L.T., Caspari, S., Ignatov, M.S., Konstantinova, N.A., Lockhart, N., Papp, B., Schröck, C., Sim-Sim, M., Bell, D., Bell, N.E., Blom, H.H., Bruggeman-Nannenga, M.A., Brugués, M., Enroth, J., Flatberg, K.I., Garilleti, R., Hedenäs, L. ... & Porley R.D. (2020).** An annotated checklist of bryophytes of Europe, Macaronesia and Cyprus. *Journal of Bryology*, 42(1), 1–116. <https://doi.org/10.1080/03736687.2019.1694329>
- Marstaller, R. (1987).** Bemerkenswerte Moosgesellschaften im Kalkgebiet bei Rübeland Harz (Bezirk Magdeburg). *Wissenschaftliche Zeitschrift / Friedrich-Schiller-Universität Jena. Mathematisch-naturwissenschaftliche Reihe*, 36, 469–499.
- Marstaller, R. (2006).** Syntaxonomischer Konspekt der Moosgesellschaften Europas und angrenzender Gebiete. *Hausknechtia, Beiheft 13*, 1–192.
- Mucina, L., Bültmann, H., Dierßen, K., Theurillat, J. P., Raus, T., Čarni, A., Šumberová, K., Willner, W., Dengler, J., García, R.G., Chytrý, M., Hájek, M., Di Pietro, R., Iakushenko, D., Pallas, J., Daniëls, F.J.A., Bergmeier, E., Santos Guerra, A., Ermakov, N. ... & Tichý, L. (2016).** Vegetation of Europe: hierarchical floristic classification system of vascular plant, bryophyte, lichen, and algal communities. *Applied Vegetation Science*, 19(1), 3–264. <https://doi.org/10.1111/avsc.12257>
- Onyshchenko, V.A., & Virchenko, V.M. (2020).** Epiphytic and epixylic bryophyte communities of Hosiivskyi National Nature Park. *Ukrainian Botanical Journal*, 77(1), 23–33.
- Partyka, L.Y. (1966).** Mossy communities and their participation in the vegetation cover of the main ridge of the Crimean Mountains. *Ukrainian Botanical Journal*, 23(1), 75–81. (In Ukrainian)
- Ulychna, K.O. (1958).** Mossy synuses of the Bukovyna Carpathians. *Scientific Proceedings of Lviv Natural History Museum*, 6, 50–72. (In Ukrainian)
- Ulychna, K.O. (1980).** Dynamics of mossy synuses of the Opillia beech stands. *Ukrainian Botanical Journal*, 37(6), 45–48. (In Ukrainian)
- Virchenko, V.M. (2011, April 6–8).** Epiphytic mosses increasing their distribution in Ukraine. In *Proceedings of the All-Ukrainian Scientific Conference "Botany and mycology: problems and prospects for 2011–2020"* (pp. 171–173). Kyiv. (In Ukrainian)
- Virchenko, V.M., & Pleskach, L.Y. (2020, March 5).** Expansive bryophytes of the Dendrological Park "Olexandria". In *Proceedings of 9th International science and practice conference "Plants and urbanization"* (pp. 12–15). Dnipro. (In Ukrainian)

Епіфітні мохові угруповання дендропарку “Олександрія” НАН України

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У статті представлені результати досліджень епіфітних мохових угруповань дендропарку “Олександрія”. Дослідження проводили в локалітетах історичної частини дендропарку “Олександрія” у 2021 році. Серед досліджених форофітів були представлені наступні деревні види: *Acer platanoides*, *A. pseudoplatanus*, *Betula pendula*, *Carpinus betulus*, *Fraxinus excelsior*, *Quercus robur*, *Populus* sp., *Salix babylonica* та деякі інші.

Результати досліджень показали, що епіфітна мохова рослинність історичної частини дендропарку “Олександрія” представлена двома безранговими угрупованнями та 11 асоціаціями, які належать до шести союзів, чотирьох порядків і трьох класів. Найбільш поширеними в дендропарку виявилися асоціації *Dicrano scoparii-Hypnetum filiformis*, *Platygyrietum repentis*, *Leskeetum polycarpae* та безрангове угруповання *Leucodon sciuroides* класу *Frullanio dilatatae-Leucodontetea sciuroidis*.

Установлено, що за кількістю виявлених мохових асоціацій дендропарк “Олександрія” подібний до Національного природного парку “Гомільшанські ліси” Харківської обл. (11 зареєстрованих асоціацій) та Природного заповідника “Канівський” Черкаської обл. (12 зареєстрованих асоціацій), але бідніший від Національного природного парку “Голосіївський”, що знаходиться в місті Київ, де зареєстровано 16 бріоасоціацій.

Ключові слова: епіфітні мохові угруповання, форофіт, бріоасоціації, дендропарк “Олександрія”