



The Investigation of Epiphytic Bryophlora on The Undergrowth in Stradch Arboretum

Pundiak Oleh*

Botanical Garden of Ukrainian National Forestry University, Ukraine

*Corresponding author: Pundiak Oleh, Botanical Garden of Ukrainian National Forestry University, Ukraine

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Abstract

Bryophlora of the surveyed undergrowth was mainly represented by only species-moss *Brachythecium salebrosum* (Hoffm. ex F. Weber & D. Mohr) Schimp. It occurred only near the soil on stem bases of the investigated understory. The bryophyte cover was independent from the species identity of the undergrowth, but depended on the local level of anthropogenic impact, which expressed mainly in removing of died adult trees. It was revealed that the moss occurred on the undergrowth only on the experimental plots (each of 0,01 ha), where during last three years no less than 4 trees had died and were removed. So, it may be a good test of the level of anthropogenic pressure in a managed forest coenosis.

Keywords: Bryophytes; Epiphytes; Phorophytes; Undergrowth; Managed Forest; Anthropogenic Pressure

Introduction

Bryophytes are extremely sensitive phytocoenosa components. They sense scanty changes of physical and chemical parameters of natural environment [1,2]. Therefore, bryophytes are often used as effective indicators of the changes of the environmental ecological conditions [3]. Currently, the epiphytic bryophlora on adult individuals of both deciduous and coniferous species is intensively studied [4,5]. But epiphytic bryophytes growing on young phorophytes are studied less intensively [6,7]. It was shown, that understory vegetation is also good indicator of the ecological situation in managed forests [2]. Thus, the investigation of the bryophytes growing on the undergrowth are worthy for more deep investigation.

The Study Area

The study area, Arboretum of Botanical Garden of Ukrainian National Forestry University, is located in Yavoriv district of Lviv region, West-Ukraine. It is situated in the south-eastern part of Ukrainian Roztochia in 20 km to the west of Lviv city. On the collection part of the Arboretum (of 5,7 ha) there grow 1613 adult individuals of trees, which belong to 126 taxa, 49 gena, 21 familia. 88% of these trees are within 30-53 years old. Another part of the Arboretum is 140 years old hornbeam-beech-pine-oak forest of 9,8 ra. In the forest there grow about 9800 adult trees.

Sampling Methods

The bryophlora of the undergrowth was investigated in different dendrological biogroups (where on 100 square meters grow now not less than 5 adult trees) far from the Arboretum paths and landscape areas. The local anthropogenic pressure in such biogroups depends mainly on dying intensity of the trees thanks to immediate works for their removing. Near the paths and in the landscape areas the undergrowth is often removed (one time per 1-2 month in vegetation period), but in the depth of the dendrological biogroups – only one time per 3 years. There the undergrowth consists of regionally wide spread species *Fagus sylvatica* L., *Carpinus betulus* L., *Sambucus nigra* L., *Swida alba* (L.) Opiz., *Euonymus europaea* L. and individuals germinated from the seeds, which had matured on neighboring plants. The removing of died trees in the forest carries out only once every 10 years. The removing of undergrowth there don't carry out at all. The investigation was carried out in March 2019. The epiphytic bryophlora was surveyed on entire individuals of the undergrowth growing on the 10 experimental plots (each of 0,01 ha) located far (no less than 50 m) from the paths within the collection part and also on 10 plots of the same dimension in the forest. The average surface area of moss mats per a surveyed stem and per 1 cm of the stem diameter (S) of each undergrowth species was measured. It

was also measured the percentage of the individuals with mosses among all surveyed individuals - possibility of moss occurrence (P).

Results and Discussion

The epiphytic bryophlora of the undergrowth was represented mainly by only species *Brachythecium salebrosum* (Hoffm. ex F. Weber & D. Mohr) Schimp. It occurred only at the base of surveyed young trees, bushes and even on dry stems of nettle (*Urtica dioica* L.) and raspberry (*Rubus idaeus* L.). In the forest P and S everywhere equaled 0. In the collection part P and S were bigger than 0 only in several plots. On such plots no less than 4 trees had died and soon were removed during last three years (Table 1). There was revealed also moss *Amblystegium serpens* (Hedw.) Schimp. It occasionally occurred only on three individuals of *S. nigra* (S = 4,8 cm). Thus, in table 1 there presented only the data concerning *B. salebrosum*. For this moss the values of locally calculated P and S didn't considerably differ for different species of the undergrowth. Therefore, only averaged values P and S for different undergrowth species are presented in Table 1.

Table 1: The dependence of P and S on the number of died trees during 3 last years on the plots of the collection part.

The Number of Died Trees During 3 Last Years	The Number Of Plots	P %	S cm
0 - 3	6	0	0
4	1	21,3 ± 3,5	0,7 ± 0,1
5	2	32,1 ± 4,1	1,5 ± 0,1
6	1	80,4 ± 3,5	5,1 ± 0,2

As it known *B. salebrosum* belongs to ecological group of generalists, which can grow on different substrates [8]. In forests

it normally occurs on logs, adult tree trunks, and on stones. The process of the removing of an adult died tree leads to leaf litter layer damage. Shortly thereafter *B. salebrosum* appears on the ground, but soon pressed by typical epigeic bryophytes it uses the undergrowth stems as a substrate. The occurrence of bryophytes on the stem base of the undergrowth is clearly visible. So, it can be a good test of the level of anthropogenic pressure in a managed forest coenosis.

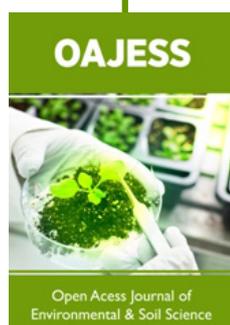
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