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# Methods used to study epiphytic lichen communities in oakwoods of Lithuania

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**I. Prigodina-Lukošienė,  
J. R. Naujalis**

*Department of Botany and Genetics,  
Vilnius University,  
M. K. Čiurlionio 21/27,  
LT-2009 Vilnius, Lithuania.  
E-mail: ingrida.prigodina@gf.vu.lt,  
jonas.naujalis@gf.vu.lt*

Sociology of epiphytes is a new branch of studies in Lithuania. The current paper presents the methodology of studying the epiphytic lichen communities in oakwoods of Lithuania. The size of relevés and species evaluation scale in them are discussed. An identification key for the classes of epiphytic lichen communities in oakwoods of Lithuania is presented.

**Key words:** epiphytic, lichens, communities, Lithuania

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## INTRODUCTION

Like vascular plants, lichens in the wild are forming constantly recurring combinations of species on various substrates. Studies of lichen communities on trees, stones, decayed wood and anthropogenic substrates have been carried out for several decades worldwide. In Lithuania, the sociology of lichens was practically not studied up to now; all former works dealt only with biocenoses of epigeic lichens [1–3].

Author of this article started phytosociological studies of epiphytic lichens in Lithuanian oakwoods. At the moment epiphytic communities of the Antalieptė oakwood (Gražutė regional park, Zarasai district), Varnikai forest (Historical Nacional Park of Trakai, Trakai district) are being studied [4, 5].

The article presents a methodology for epiphytic lichen study, which was prepared on the basis of various literature sources and the author's own results.

## METHODS

The methodology of epiphytic lichen studies was prepared following the authors of [6–15].

The syntaxonomy of the communities is presented following Wirth [16].

## RESULTS AND DISCUSSION

The methodology of the present epiphytic lichen study is based on the Braun–Blanquet method which

was modified following Klement [16] and Barkman [6].

The classification of epiphytic communities, the same as of vascular plant communities, starts from the analytical-descriptive stage during which relevés are described. Different authors, examining epiphytic communities in their works, use different sizes of relevés. The number varies from 4 to 40 cm<sup>2</sup>. Because of different tree trunk dimensions, two sizes of relevés are used most often. For the present studies, 20 cm<sup>2</sup> frames for trees with a trunk volume larger than 80 cm, and 10 cm<sup>2</sup> for trunks with a volume smaller than 80 cm were used. As to the field sizes, oblong relevés should be mentioned, which are used to study the epiphytic communities on tree twigs and branches or in the bark cracks. An example is communities of the *Calicion viridis* union found in the cracks of coarse or heavily chapped bark. To evaluate the species composition of such communities the most appropriate field size is 1 x 35 cm [11]. Author of the present paper in her studies uses frames made from pellicle and divided into 2 cm square windows. This allows to evaluate the species distribution percentage more easily.

Species in the relevés are evaluated following the Braun-Blanquet scale modified by Wirth [15]: r = 1–2 individuals (small species), + = up to 5 individuals, coverage 1%, from 1 to 20 individuals, 5% coverage; 2 m = more than 20 thalli, coverage 5%; 2a = any number of individuals, 5 – 12.5%; 2 b = any number of individuals, coverage 12.5–25%; 3 = any number of

individuals, coverage 25–50%; 4 = any number of individuals, coverage 50–75%; 5 = any number of individuals, coverage 75–100%.

In the phytocenotic studies of epiphytes, trunk dimensions are measured in the places where relevés were described. It is useful to describe relevés on various heights and on various trunk expositions of one phorophyte. This allows to compare species composition of fields with the same physiognomy from the southern and northern parts of the trunk and from various heights. In a field description, an expansion of the same species composition on a tree, influence of surrounding vegetation, leaning corner of the tree, light conditions are noted. It is recommended to describe as much relevés as possible on the same tree species and fields on different species of trees.

The relevés being described, the next step is to make the primary phytocenotic tables. Descriptions with the same (homogeneous) composition of species are entered into one table. As in vascular plants, a description that heavily extends the list of species is rejected. The constancy coefficient for every species is calculated. This is a percentage frequency of the species in the table. Following the Braun-Blanquet classification, there exist five groups of constancy: group V covers species from the table with the frequency between 100–81% group, IV – 80–61%, III – 60–41%, II – 40–21%, I – 20–1%. Based on the primary table, a constancy table is made. In this table the species are arranged in a declining order: from the most constant to accidental species. The table is also provided with the following information: field research number, description date, tree trunk exposition, number of all taxons found in the relevés, and tree trunk dimension. In the synthetic table, the species are arranged in the following way: diagnostic species of association, alliance, order, classes and other species. On the basis of such table it is possible to analyze the community.

Based on the epiphytic communities studies in the Antalieptė oakwood and in the Varnikai forest, a key has been constructed, which reflects differences between the main epiphytic community classes found in Lithuanian oakwoods.

1. Community distinguished by a few lichen species and abundance of mosses ..... 2  
– Mosses in the community are absent or rare ..... 3
2. Community is characterized by old forest indicator species (*Lobaria*, *Nephroma*) or the genus *Peltigera* species are present .....

- Class *Frullanio dilatatae* – *Leucodontetea sciuroides* Mohan 1978 em. Marst. 1985  
– Community is characterized by dominant *Cladonia* species .....
- Class *Cladonio* – *Lepidozieta* Jaček & Vondr. 1962
3. Crustose lichens dominant ..... 4  
– Foliose and/or fruticose lichens ..... 6
4. Arthonioid, lirelliform or pyrenocarpous lichens dominant  
Class *Arthonio-Lecidelletea elaeochromae* 1993  
– Other forms of crustose ..... 5
5. Leprose, granulose forms of crustose lichens most frequent in rain-shielded places, in bark cracks or hollows  
Class *Chrysotrichetea candelaris* Wirth 1980  
– Ascocarpous, squamulose lichens  
Class *Lecanoretalia varia* Barkm. 1958
6. Community of nutrient-rich or nutrient-enriched bark and characterized by the genera *Physcia*, *Physconia*, *Anaptychia*, *Xanthoria*  
Class *Physcietea Tomaselli & De Micheli* 1957  
– Community of nutrient-poor bark and characterized by the genera *Parmeliopsis*, *Parmelia*, *Hypogymnia*, *Evernia*, *Bryoria*, *Pseudovernia*  
Class *Hypogymnietea physodis* Follm. 1974

Till now, 18 lichen communities belonging to different classes have been recorded in the oakwoods studied. The rarest community is *Lobararietum pulmonariae* Hil. 1925, belonging to the class *Frullanio dilatatae* – *Leucodontetea sciuroides*. It is found only on oaks in the Varnikai oakwood. Other communities are frequent and found both on different and the same phorophytes.

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