

REFOUND OF EXTINCT LICHEN *LOBARIA AMPLISSIMA* (SCOP.) FORSELL IN LATVIA

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Lobaria amplissima is rare lichen in many European countries, including Latvia, where it is listed as extinct species with last known record in 1870 from Slitere, North – West Latvia. This species was refound in a spring of 2014 in North Vidzeme Biosphere Reserve on East from the past record in broad-leaved forest and black alder forest. The distribution of *Lobaria amplissima* in Latvia was discussed.

Key words: *Lobaria amplissima*, distribution, deciduous trees.

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INTRODUCTION

The range of *Lobaria amplissima* (Scop.) Forssell covers Europe, Macaronesia, North America, Caucasus (Russia), Asia and Africa being oceanic – suboceanic species (Zalewska & Bohdan 2012) and prefers deciduous tree bark (Jørgensen & Tønsberg 2007) as found mostly on main branches of *Fraxinus* sp., *Ulmus* sp., *Acer pseudoplatanus* and *Quercus* sp. (Smith et al. 2009, Урбанавичюс 2010), *Castanea* sp. (Nimis 1993), *Fagus sylvatica*, rarely on

Sorbus aucuparia (Liška et al. 1996), *Larix* sp. (Zalewska & Bohdan 2012) as well also on lava outcrops (Aptroot & Zielman 2004) and on mossy acidic rocks in moist forests (Jørgensen & Tønsberg 2007). *Lobaria amplissima* was found mostly in wet alder forests in Poland exclusively on fallen *Fraxinus excelsior* stem close to the crown and on thick branches (Zalewska & Bohdan 2012). *Lobaria amplissima* was found in nine localities in Białowieża Forest, Poland and suggested to be included in Poland lichen Red-list (Zalewska & Bohdan 2012). *Lobaria*

amplissima in Czech Republic is rare species and included also in Red-lists of Sweden (Vimba & Piterāns 1996), Slovakia, Austria, Germany and Switzerland as endangered species (Liška et al. 1996). A. Aptroot and R. Zielman (2004) and J. Liška et al. (1996) mentioned, that *L. amplissima* is negatively affected by air pollution and forest management activities such as cuttings and drainage. The species characterizes forests with the highest natural quality (Zalewska, Bohdan 2012). *Lobaria amplissima* is epiphytic, growing on deciduous trees and reproducing sexually by spores (Vimba & Piterāns 1996).

Lobaria amplissima is Red-listed lichen species in Latvia (0 category, extinct species, Vimba & Piterāns 1996). The last record till 2014 was known only from 1870 in Slitere collected by A. Bruttan in North-West Latvia, on dead deciduous tree. In the spring of 2014 *L. amplissima* initially was found on one dead *F. excelsior* log under the snow cover in North Vidzeme Biosphere Reserve (Jurciņš 2014).

The aim of the present study is to characterize *L. amplissima* distribution in Latvia based on field studies, herbarium material and literature.

MATERIAL AND METHODS

Study area

The field work was conducted in 16.03.2014 and in 12.04.2014 in the vicinity of Pale village, Limbazi district, North Vidzeme Biosphere Reserve, Northern Latvia (Fig. 1). *Lobaria amplissima* was found using route method on three *Fraxinus excelsior* fallen dead logs (substrate tree) in 'kvartāls' nr. 160 ('nogabali' nr. 7, nr. 8). 'Kvartāls' is unit used in Latvian forestry for numbering different forest patches and 'nogabals' is subunit into the 'kvartāls' (Tab. 1) in protected forest habitats – Fennoscandian hemiboreal natural old broad-leaved deciduous forest (*Quercus*, *Tilia*, *Acer*, *Fraxinus* or *Ulmus*) (9020*) (broad-leaved

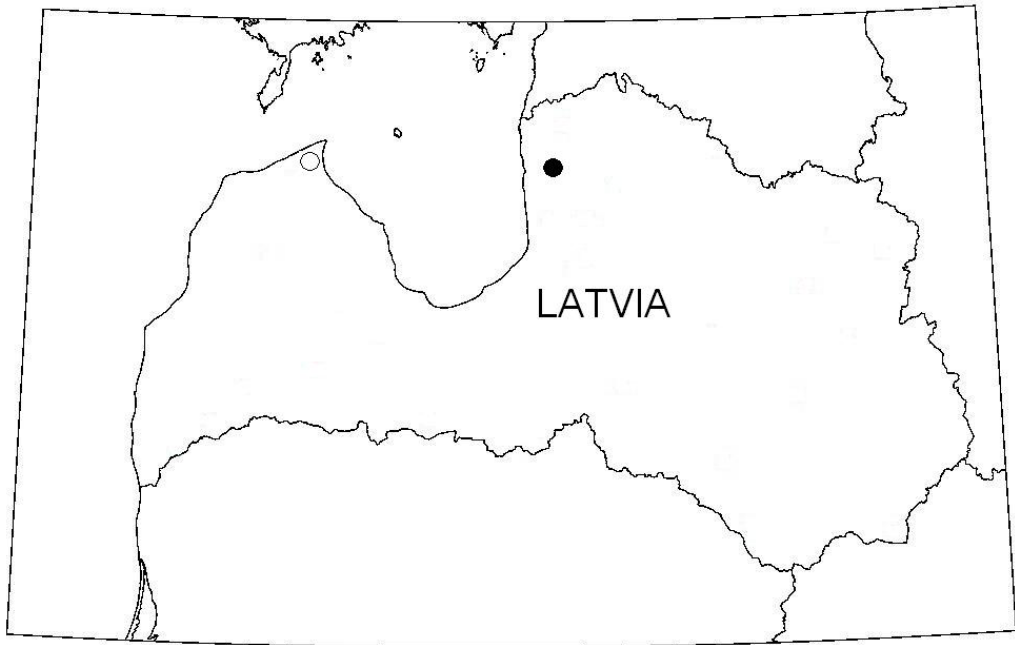


Fig. 1. *Lobaria amplissima* locations in Latvia. White dot – found in 1870, black dot – found in 2014.

Table 1. Characteristics of substrate trees, where *Lobaria amplissima* was found

Characteristics	Substrate trees		
	1	2	3
Size of <i>Lobaria amplissima</i> (cm)	50x30	40x30	20x30
DBH (m)	0.20	0.25	0.20
Forest type	BL	BL	Sw
Location (number of 'kvartāls' and 'nogabals')	160. kv., 7. nog.	160 kv., 7. nog.	160. kv., 8. nog.
Forest stand age (years)	112	112	72
Forest stand area (ha)	0.70	0.70	3.60
Bryophytes			
<i>Brachythecium rutabulum</i>			x
<i>Brachythecium salebrosum</i>		x	
<i>Dicranum montanum</i>		x	x
<i>Frullania dilatata</i>	x		
<i>Homalia trichomanoides</i>	x		x
<i>Hypnum cupressiforme</i>	x	x	
<i>Leucodon sciuroides</i>	x	x	
<i>Neckera pennata</i>		x	x
<i>Orthotrichum obtusifolium</i>		x	
<i>Orthotrichum speciosum</i>		x	
<i>Plagiomnium cuspidatum</i>	x		x
<i>Pylaisia polyantha</i>	x		x
<i>Radula complanata</i>	x	x	
<i>Rhodobryum roseum</i>		x	
<i>Ulotia crispa</i>		x	
<i>Zygodon rupestris</i>		x	
Lichens			
<i>Acrocordia gemmata</i>		x	
<i>Anaptychia ciliaris</i>		x	
<i>Evernia prunastri</i>	x		
<i>Lepraria</i> sp.	x		
<i>Lobaria amplissima</i>	x	x	x
<i>Lobaria pulmonaria</i>	x	x	x
<i>Nephroma laevigatum</i>	x		
<i>Parmelia sulcata</i>	x	x	
<i>Pertusaria albescens</i>	x		
<i>Pertusaria amara</i>	x		
<i>Phlyctis argena</i>	x		
<i>Platismatia glauca</i>	x		
<i>Ramalina farinacea</i>	x		

BL – Fennoscandian hemiboreal natural old broad-leaved deciduous forests (*Quercus*, *Tilia*, *Acer*, *Fraxinus* or *Ulmus*) (9020*) (Auniņš et al. 2013), Sw – Fennoscandian deciduous swamp woods (9080*) after Auniņš et al. 2013, 1 – species was found on particular substrate tree, x - presence of species.

forest) and in Fennoscandian deciduous swamp wood (9080*) (black alder forest) (Auniņš et al. 2013). Forest stands were 72-112 years old and stand area varied 0.70-3.60 ha. All three forest stands were characterised with fallen dead logs in various decay stages and alive canopy

deciduous rees – *Tilia cordata*, *Alnus glutinosa*, *Fraxinus excelsior* were dominating in different age classes. Most of standing *Fraxinus excelsior* trees were dead. Understory were dominating by bushes – *Ribes alpinum*, *Daphne mezereum*, *Corylus avellana*, flowering plants



Fig. 2. *Lobaria amplissima* patch on first substrate tree. The scale of ruler - 5 cm in nature. Photo by D. Jurciņš.



Fig. 3. *Lobaria amplissima* with apothecia and some pycnidia on second substrate tree. One unit of scale corresponds to 1 mm in nature. Photo by D. Jurciņš.

– *Chryso-splenium alternifolium*, *Mercurialis perennis*, *Ficaria verna*, *Filipendula ulmaria*, mosses – *Cirriphyllum piliferum*, *Calliergonella cuspidata*, *Eurhynchium angustirete*, *Plagiomnium cuspidatum*. The samples with *L. amplissima* and some other lichens and bryophytes were collected for further identification at the laboratory and herbarium (Herbarium Universitatis Latviensis, personal herbarium of authors).

Laboratory work

The collected *Lobaria amplissima* material (Leg. D. Jurciņš, Det. D. Jurciņš 16.03.2014, Herbarium Universitatis Latviensis, Leg. A. Mežaka, Det. A. Mežaka 12.04.2014 (personal herbarium)) was compared to A. Bruttan herbarium material collected in 1870 in Slitere, (Leg. A. Bruttan, Det. A. Bruttan, Herbarium Universitatis Latviensis, 81 (BA)) at the Department of Botany and Ecology, Faculty of Biology, University of Latvia. Some lichen and bryophyte species were identified at the Research Institute for Regional Studies, Rezekne Higher Education Institution. For lichen species identification were used keys P.M. Jørgensen & T. Tønsberg (2007), C.W. Smith et al. (2009), for bryophyte species identification were used M.C. Игнатов & Е.А. Игнатова (2003) and M.C. Игнатов & Е.А. Игнатова (2004).

RESULTS

The only record of *Lobaria amplissima* (Scop.) Forssell known till 2014 in Latvia was in Slitere in 1870, when A. Bruttan found it on dead deciduous log (Питеранс 1982), but record was not found afterwards. *Lobaria amplissima* was refound by D. Jurciņš in 16.03.2014 on one fresh *Fraxinus excelsior* dead log in Pale village, Limbazi district, North Vidzeme Biosphere Reserve. In the second expedition, where most of authors of this article were taking part, *L. amplissima* was found on two additional *F. excelsior* dead logs at the same geographical location. *Lobaria amplissima* was found in height of approximately five metres on three

dead logs of *Fraxinus excelsior* and the average distance between logs were ~50 m. All three *F. excelsior* substrate trees with *L. amplissima* were fallen down recently. The average size of *L. amplissima* on substrate trees were 30x30cm (Tab. 1) with high vitality. *Lobaria amplissima* were found together with other Red-listed species in Latvia – *Nephroma laevigatum* (category 1, endangered) on first substrate tree with *L. pulmonaria* (category 2, vulnerable) on all three substrate trees and with *Zygodon rupestris* (category 3, rare) on second substrate tree.

Differences were found in *L. amplissima* associated species composition among three substrate trees. For instance, *Frullania dilatata*, *Ramalina farinacea*, *N. laevigatum* were found only on the first substrate tree, while *Brachythecium salebrosum*, *Orthotrichum obtusifolium*, *Z. rupestris* were found exclusively on the second substrate tree, but *B. rutabulum* was found only on the third substrate tree.

DISCUSSION

The results show, that rare species may be found in relatively isolated old-growth forest patches. Based on the present study, seems, that *Fraxinus excelsior* is the most suitable substrate tree for the distribution of *Lobaria amplissima* in the Baltic region. Zalewska & Bohdan (2012) found *L. amplissima* in black alder forest and exclusively on *F. excelsior* dead log, similarly as it was found in Latvia. The studied territory is characterized as old-growth forest, where high humidity, efficient amount of light and occurrence of old mossy trunks appear suitable for *L. amplissima* distribution as mentioned by other authors (Nimis 1993, Rose & Purvis 2009).

The latest record of *L. amplissima* in Latvia shows, that there is still available suitable forest patches and substrates for this species in Latvia. The present record of *L. amplissima* also increases the distribution area of this species to East in Latvia.

The circumstances of *L. amplissima* is not clear in Latvia in a future. Based on the present study results, the population of *L. amplissima* was isolated on three dead *F. excelsior* logs, being short term substrates. The potential long-term substrate tree - alive *F. excelsior* - is lacking in studied territory and probably the population of *L. amplissima* will go to extinct similar to the Central European refugia in Czech Republic (Liška et al. 1998). In addition, forests with *F. excelsior* (Lygis et al. 2014) and also other species associated with these forests are vanishing in Baltics.

The whole area of North Vidzeme Biosphere Reserve was not studied during the present study, but the adjacent forest stands with potential substrate trees and habitats for *L. amplissima* were checked. We expect, that *L. amplissima* might be in other localities with similar substrate trees and forest stands in North Vidzeme Biosphere Reserve. Future inventories of suitable forest patches are needed and probably may increase the number of *L. amplissima* records in Latvia.

We suggest the transplantation experiments for *L. amplissima* rescue as it was done and suggested by Gilbert (1991) in Great Britain. Probably also experiments in *L. amplissima* sexual reproduction by spores may help to conserve this species in Latvia.

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