Distribution and habitat ecology of the threatened forest lichen *Lobaria pulmonaria* in Estonia

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*Lobaria pulmonaria* (lung lichen, h. kopsusamblik) is a conspicuous and widely known epiphytic lichen species of the northern hemisphere.
Introduction

- Favours natural forests and grows in woodlands or parklands of long ecological continuity
- Sensitive to forest management and air pollution (SO$_2$)
- Major decline in Europe, Asia and North-America
- National status: near threatened (NT), protection category III.

Task I

- the distribution
- habitat preference
- host tree specificity of *L. pulmonaria* in Estonia

Task II

- the factors affecting the presence and coverage of *L. pulmonaria* within the stand – in traditionally managed but now abandoned wooded meadows of Estonia (Suurekivi, Haavakannu and Lasila wooded meadows).

To quantify:

Lasila wooded meadow with large population of *L. pulmonaria*
Data

- 302 records were registered during Woodland Key Habitat Inventory (1999-2002);
- 107 records were registered during the survey “Estonian Forest Conservation Area Network” from the period 1999-2000;
- 95 personal notes and the herbarium specimens deposited at the University of Tartu (TÜ), the period 1904-2002;
- 159 trees with *L. pulmonaria* studied in northeastern Estonia in three overgrown wooded meadows.

Results

Localities of *L. pulmonaria*

*Lobaria pulmonaria* is a forest dependent species:
- 87% of the records were from forests,
- 10% from wooded meadows,
- 3% from parks.

Green area represents forestland according to Peterson (2003).

(Jüriado & Liira 2009)
Results

The proportion (%) of Lobaria pulmonaria on different host tree species

- Populus tremula 29%
- Feaxinus excelsior 21%
- Acer platanoides 13%
- Sorbus aucuparia 5%
- Ulmus glabra 5%
- Quercus robur 8%
- Salix caprea 5%
- Tilia cordata 4%

It prefers host trees which have a restricted distribution or are unfavoured by forest management practice.

It is abundant in forest types which are rare or under strong economic pressure.

The frequency distribution of Estonian forests among the forest age classes (open bars; Karoles, 1995) and the frequency distribution of forests with L. pulmonaria among the forest age classes (filled bars).

→ the rotation period of stands is too short!
Results

Protected areas: nature reserves, national parks
Valuable areas: Woodland Key Habitats and pre-selection areas of the Estonian Forest Conservation Area Network

The frequency of occurrence of *L. pulmonaria* among three forestland categories (pieplot).

The number of observations of *L. pulmonaria* among the area size classes within Valuable areas and Protected areas (barplot and left axis).

The overall frequency distribution (%) of the area size classes of Valuable areas and Protected areas is given by the lineplot (right-hand y-axis for count percentage).

The probability of presence of *L. pulmonaria* in wooded meadows:

- was significantly correlated with light conditions and height of the shrubs in 1 m radius around the trunk
- was dependent on the host tree species and vitality of the tree
- decreased with the distance from the nearest colonized trees.
Results

The coverage of *L. pulmonaria* in wooded meadows

- was significantly influenced by the coverage of bryophytes and bark roughness
- was dependent on the host tree species and side of tree trunk.

Present day distribution of *Lobaria pulmonaria* in Estonia

The status of locality:
- **OK (73%)**
- **endangered (19%)**
- **destroyed (8%)**
Present day

The status of locality:
- OK (73%)
- endangered (19%)
- destroyed (8%).

Where to go now?

- **Habitat protection** – more attention for habitat remnants
- **Protection of host tree** – changes in forest management style – more species-rich (mixed) stands
- **The maintenance of suitable environmental conditions** – heterogeneous environment with gaps, bushes, regrowth and old trees
- **Overcoming the dispersal limitation** – transplantation of *L. pulmonaria* in suitable habitats
Partially overgrown wooded meadows proved to be suitable habitats for *L. pulmonaria*

Where to go now?

Old wooded parks could be alternative habitats for *L. pulmonaria*, if their management would become more flexible.

L. pulmonaria in the park of manor Krüüdneri

Transplantation into the park of manor Kastre from manor Luke
Thanks!

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