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# EXPERIMENTS ON RESTORATION OF RAISED BOG VEGETATION COVER IN ABANDONED PART OF CUT-AWAY PEATLAND

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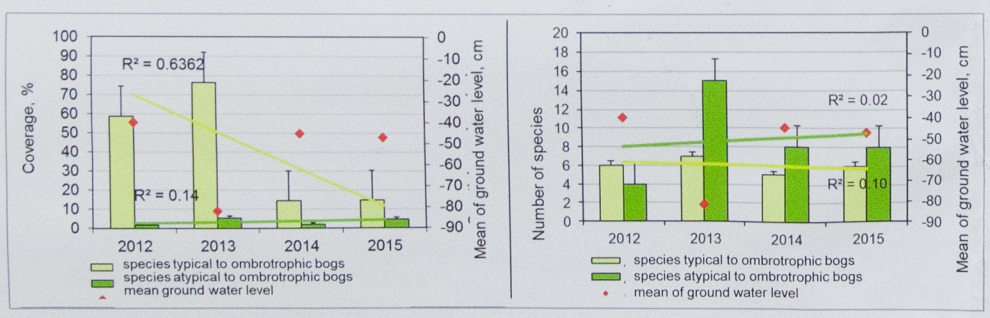
## Introduction

In Lithuania, only a few attempts to restore mire ecosystems in abandoned extracted peatlands have been made. The first restoration actions were implemented in 2001 in Puščia peatland (270 ha), later on Gegužinė (57 ha) and Velniabalė (110 ha) peatlands. The technique used included filling the small ditches with peat, constructing dams, and removing trees and shrubs. However, typical raised bog vegetation was not reintroduced in any of the above-mentioned extracted peatlands.

## Experiments

The first small-scale experiments on spreading of *Sphagnum* mosses in cut-away peatland were implemented in Aukštumala peatland (Western Lithuania) in 2011–2012. A total of 130 patches (0.4×0.4 m in size and 5–7 cm thick) of typical raised bog vegetation were planted on the bare peat substrate in the specially prepared part (0.12 ha) of cut-away peatland. The patches were collected from a donor site in a degraded part of Aukštumala raised bog. More resistant to changes in soil moisture the species of *Sphagnum fuscum, S. magelanicum, S. capillifolium* dominated in the planted patches.


*Experiment site No 1. Introduction of raised bog moss (Sphagnum sp.) cover patches into the restoration site (Aukštumala peatland, Šilutė district, Lithuania, September 2011):*
*a-c – fragments (0.4 m x 0.4 m x 0.07 m) of natural raised bog moss cover (S. rubellum, S. magelanicum, S. capillifolium with Eriophorum vaginatum, Vaccinium palustris, Andromeda polifolia) ready for the introduction into the restoration site;*
*d-e – introduced fragments of moss cover*




*Due to unfavorable hydrological conditions at the experimental site No. 1 (GWL depth during the vegetation period varied from -45 to -82 cm) and dry growing seasons in the last three years, a coverage of typical ombrotrophic plant species decreased from 58 (in 2012) to 14% (in 2015).*

Due to the fact that the peatland is still used for peat cutting, it was difficult to maintain ground water level depth adequate for the development of raised bog vegetation. The results of the experiment showed that in the next year after the planting, 93% of the planted fragments recovered successfully. Twenty-two plant species from 12 families were recorded at the experimental site. About 68% of the recorded species (*Agrostis capilaris, Bidens tripartita, Frangula alnus, Gnaphalium sylvaticum, Lycopus europaeus, Lysimachia vulgaris, Molinia cearulea, Salix aurita, S. cinerea, Taraxacum officinale*, etc.) were atypical to ombrotrophic bogs. The most significant changes in the vegetation coverage were ascertained for *V. oxycoccus* (the coverage increased from 5 to 18%), whereas the mean cover of *Sphagnum* spp. increased only by 4% during the first two years of the experiment.

## Future

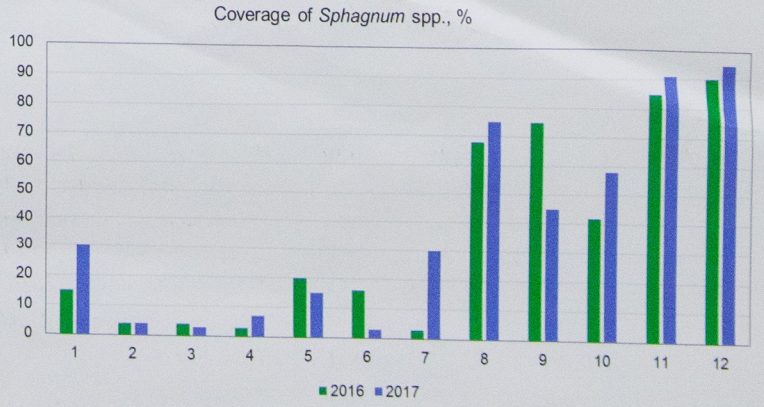
Maintenance of optimal water level is one of the most important ecological factors for successful establishment of raised bog plants at restoration sites. Therefore, currently, the elaboration of water level regulation and maintenance system in Aukštumala peatbog is being carried out.

To assess hydrological conditions in ***a new experimental field*** (10 ha in size), 12 water level measurement wells with automatic loggers TD Divers were installed in 2017. New data will allow to get more comprehensive view on hydrological state of the area and to chose the best decision for establishment of *Sphagnum* cover in a new prepared experimental field.

These activities will be implemented as a part of LIFE project
***Peat Restore - Reduction of $CO_2$ emissions by restoring degraded peatlands in Northern European Lowland (LIFE15 CCM/DE/000138)***


*Locations of Sphagnum spreading experimental sites, Aukštumala peatland, Šilutė district, Lithuania*


*Experiment site No 2. Sphagnum spreading and mulching by straw. Coverage of Sphagnum spp., in August 2016 (second year of the experiment):*
*Note: in June of 2017 Sphagnum cover totally dry; GWL > -80 cm;*
*in August of 2017 Sphagnum cover revive; GWL -10 - +12 cm*


*Experiment site No 3. Sphagnum spreading and mulching by straw. Coverage of Sphagnum spp., in August , 2016 and June, 2017 . GWL – -0-15 cm*