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Effect of peatland degradation on bryophyte species composition in Latvia and Lithuania

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Bryophytes are pioneer species that occupy degraded sites, both after natural disturbances (e.g. fire) and human impact (e.g. logging). Post-harvested peatlands can be inhabited by bryophyte species that are adapted to extreme conditions such as drought, exposure to high sun radiation, wind erosion, etc. Still, bryophyte richness is higher in intact or less affected peatlands – raised bogs, transition mires and fens with different ecological niches. The role of bryophytes, especially *Sphagnum*, in mires involves also peat formation and carbon sequestration. Climate change mitigation by reducing greenhouse gas (GHG) emissions, low groundwater fluctuations are only some functions that are strongly related to processes in intact peatlands. To study bryophyte species composition in peatlands with different management history, data were collected in eight sites: three peatlands with minor drainage impact in Latvia and five significantly drained, post-harvested peatlands in Lithuania. Vegetation cover (bryophytes, lichens, herbs, shrubs, trees) and physical parameters (degree of site degradation, soil moisture) were recorded in 269 plots in 2017–2018 during the LIFE Peat Restore project (LIFE15 CCM/DE/000138). Additionally, vegetation data together with environmental parameters were used for indirect GHG emission assessment applying the recently developed GEST (*Greenhouse Gas Emission Sites Types*) approach. In all sites, 382 species were recorded, including 85 bryophyte species (10 liverworts and 75 mosses, including 19 *Sphagnum* species). Bryophyte species richness showed moderate positive correlation with total species richness ($r_s=0.53$, $p<0.001$), weak correlation with moisture ($r_s=0.34$, $p<0.001$) and herb cover/species richness ($r_s=0.24$, $p<0.001$; $r_s=0.28$, $p<0.001$, respectively). Bryophyte species richness was best explained by total number of species per plot, bare peat and bryophyte species cover and was site-specific. Species composition significantly differed between degraded and near-natural sites. From all recorded bryophytes, 24 species were related to one of four previously defined degradation classes using indicator-species analysis. *Campylopus introflexus*, *Pleurozium schreberi*, *Pohlia nutans*, *Polytrichum* spp. were indicators of the most degraded sites, while *Cephalozia bicuspidata*, *Dicranum bonjeanii*, *Mylia anomala*, *Sphagnum angustifolium* were found only in sites with minor drainage impact. The results suggest that bryophytes can be used as indicators to assess the degradation of peatlands.

Keywords: degraded peatlands, bryophyte species composition, indicators, GEST approach