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# Patch size and species identity affect the hydrology along the surface on *Sphagnum* dominated peatlands

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Many European peatlands which have been drained and cut-over in the past, are now re-vegetated. Nevertheless, vegetation development often stagnates in a pioneer stage. Re-introduction of target species may be a useful tool to restore a typical *Sphagnum* vegetation, but factors as patch size, water table and species identity determine the success of these measures.

*Sphagnum* mosses naturally have a different distribution along the microtopographical gradient of peatland surface. The availability of water along the microtopographical gradient and interspecific differences in response to this availability of water on its turn affects the competitive strength of *Sphagnum* species and may eventually affect the zonation of peat mosses along the peatland surface. Recently we have shown that homogeneity of physiological characteristics, anisotropy, of the peat material plays a crucial role in the availability of water at the peatland surface[1], stressing the importance of the relation between hydrological processes along the bogs surface and the peatland vegetation. Here we show the results of two experiments which were simultaneously performed in Ireland and Estonia. Special attention was paid to the effects of patch size on the performance of three different *Sphagnum* mosses, after transplantation into an existing vegetation. Concurring previous conclusions about the importance of anisotropy of the peat material, successful re-introduction of *Sphagnum* mosses into degraded peatlands is enhanced by large patch size. Additionally we show that late successional species, like hummock species, profit at low water tables, whereas hollow species profit at high water tables. Present restoration measures are

aimed at retaining water on the surface of peat remnants in order to restore a functional and diverse *Sphagnum* vegetation, which seems contrasting to restoration aims. Yet, more than the water table, patch size of the re-introduced species is crucial to make restoration measures successful, and may even provide a feedback mechanism to the hydrological conditions along the peat surface.

[1]Robroek, Limpens, et al. (2007) Interspecific competition between *Sphagnum* mosses at different water tables. *Functional Ecology* 21 (4):805-812