Geophysical Research Abstracts
Vol. 20, EGU2018-4933, 2018
EGU General Assembly 2018

Sphagnum farming initiatives in Canada: an overview

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Sphagnum farming is the cultivation of non-decomposed *Sphagnum* fibres on a cyclic and renewable basis on wet organic soil, and therefore is a form of paludiculture. There is an increasing demand for *Sphagnum* fibres in the horticultural and plant packaging market. By replacing peat from natural deposit or *Sphagnum* fibers harvested in natural peatlands, cultivated *Sphagnum* fibers from *Sphagnum* farms could reduce environmental impacts of peat extraction while maintaining the quality of growing substrates. Research on *Sphagnum* farming has made significant advances in the last decade but optimizing the factors to increase *Sphagnum* biomass accumulation need further investigations. Since 2013, two *Sphagnum* farms with automated irrigation were implemented in Eastern Canada to produce *Sphagnum* fibres. In both sites, two targets for water table (-10 cm and -20 cm), different spatial positioning of canals as well as subsurface irrigation drains were tested. The productivity of the different *Sphagnum* species introduced, the hydrology of the sites and the carbon exchanges in relation to the water level as well as the design of the farming basins have been monitored. After three and four growing seasons, the following conclusions were drawn : 1) *Sphagnum* productivity in irrigated basins is higher than in unmanaged basins: a water table maintained around -10 cm tripled the biomass accumulation whereas when maintained around -20 cm the biomass accumulation doubled in comparison to unmanaged *Sphagnum* culture basins, 2) maintaining a stable water table (range below 15 cm) resulted in higher CO_2 uptakes by the moss layer, 3) hydrology of drainage basins can be affected by ground water inputs outside the experimental area (i.e. from adjacent unrestored trenches), and by the position of the drainage canals in the landscape. Results from other small-scale trials for optimizing yields and harvesting of biomass will also be presented. Overall, our experiments have shown that the amplitude reduction of water table fluctuation and water distribution by automated irrigation is critical.