

The response of vegetation structure to active warming and precipitation reduction of the *Sphagnum* peatland

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The recent climate change (e.g. increased temperature and decreased precipitation) is expected to affect biodiversity and vegetation structure of the European peatlands, as well as carbon fluxes. Our experimental study carried out in Western Poland, tests the hypothesis that the increased temperature, in particular in combination with rainfall reduction affects vegetation structure of the *Sphagnum* peatland, through changes in moss and vascular plants abundance. The innovative climate manipulation system was installed on the Rzecin peatland in 2014. The field site consists of four blocks: "drought" "warming and drought" "warming" and "control". The air and peat temperatures were increased in 2015 and 2016 by about 0.2 °C and 1.0 °C, respectively, using infrared radiators. Precipitation was reduced by automatic curtain operated only during the nights by about 37 % in both years. Data resulting from the analyses of digital pictures as well as Point Intercept method were used to identify changes in vegetation structure as a response to warming and drought. We observed increase in abundance of vascular plant and decrease in abundance of mosses during the very dry 2015 vegetation season. It appeared that *Carex* spp. (*C. limosa* and *C. rostrata*) abundance responded positively to warming, while *Sphagnum* spp. (*S. angustifolium* and *S. teres*) responded negatively. The "warming" block was characterized by an increase in abundance of *Carex* spp. by 8.3 % to 16.7 % and decreased abundance of *Sphagnum* spp. from 25 % to 19.4 %, whereas in the block of "warming and drought" 11.4 % to by 18.3 and 38 % to 26.9 %, respectively in the August 2015. However, we observed decrease in *Sphagnum* spp. abundance in the treatment with rainfall reduction in wetter 2016, and their increase in the control. Our results show how considerable changes in vegetation structure can be expected under the stress of warming and modified rainfall conditions, even after a short-term manipulation. However, it is still challenging to explore air temperature as a key variable driving the observed species turnover. Therefore the study needs to be continued in the following years. We plan to synthesize vegetation data with carbon fluxes to obtain a better understanding of the response of peatland ecosystem to global warming.

The Research was co-funded by the Polish National Centre for Research and Development within the Polish-Norwegian Research Programme within the WETMAN project (Central European Wetland Ecosystem Feedbacks to Changing Climate – Field Scale Manipulation, Project ID: 203258, contract No. Pol-Nor/203258/31/2013 (www.wetman.pl)).