



## **An impact of past catastrophic deforestations on the hydrology of Sphagnum peatland in Northern Poland**

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Testate amoebae are very sensitive to environmental changes and have been successfully used as indicators of past hydrological dynamics of peatlands. Climate change, volcanic eruptions, fires and human-induced deforestations affect testate amoebae communities. The aim of our study is to use testate amoebae for exploring the impact of natural catastrophic deforestation by a tornado and anthropogenic deforestations on a peatland ecosystem. Testate amoebae were used to reconstruct hydrological variability on peatland ecosystem prior to and after deforestations, whereas pollen and macrofossils were used for reconstruction of the local and regional vegetation cover. We applied a high-resolution multi-proxy approach that allowed us to compare pattern generated by the tornado with the past anthropogenic deforestations ca 200 years ago. The bottom zone is characterized the high water table in the peat bog and high share of wet species and typical species in *Sphagnum* habitats such as *Archerella flavum*, *Hyalosphenia elegans* and *Hyalosphenia papilio*. *Archerella flavum* disappears during anthropogenic deforestations in the 1980s and 1990s. Rapid changes in water level on the peatland occurred in the 21st century. The peatland was drier, which may suggest the appearance of one of the dry indicator species – *Corythion dubium*. Disturbance caused by the tornado, compared to anthropogenic deforestation, was characterized by an increase of *Corythion dubium* and *Euglypha ciliata*. Our results reveal that the tornado, as well as clear cutting and insect outbreaks have affected hydrological dynamics of the bog.

This project is funded by the Polish National Science Centre (No. 2015/17/B/ST10/03430).