Peatlands – ecosystems of high value for biodiversity conservation, are affected by climate change. Peatlands cover only 3 % of land area on Earth, however they store as much as one third of global terrestrial carbon, which can have a feedback effect on climate change. Microscopic eukaryotes (micro-eukaryotes) play a key role in the functioning of peatland ecosystems. These organisms are involved in organic matter decomposition, primary production, as well as in regulating populations of other microorganisms through predation and parasitism. Micro-eukaryotes are microscopic size organisms with nucleated cells that represent enormous diversity. However, we know very little about the diversity of micro-eukaryotes, especially in peatlands. Studying the micro-eukaryotic diversity requires advanced techniques such as molecular biology tools. Recently developed methods called Next Generation Sequencing (NGS) allow to sequence millions of short DNA fragments at the same time which can be used for DNA-based biodiversity assessment. Current knowledge on micro-eukaryotic diversity prevents sound evaluation of changes in community structure in response to climate change, however, combination of NGS with manipulative experiments can give us a better insight into this research question. In the project we will examine the effects of temperature increase and reduced precipitation on biodiversity of peatland micro-eukaryotes. We will use a field experiment carried out by applying the innovative climate manipulation system and a novel molecular tool - NGS. Warming is obtained using infrared radiators and reduction of the amount of precipitation is obtained using the automated retraceable curtains. Additionally, we will compare the results with the results from another currently ongoing international project CLIMPEAT. In the project CLIMPEAT the warming is obtained using the passive warming – hexagonal chambers made of polycarbonate called Open Top Chambers (OTC).