REAL-TIME MONITORING OF LICHEN PHYSIOLOGICAL ACTIVITY DURING DESICCATION-REHYDRATION CYCLES

José Ángel Morales Sánchez[1*]; Upasana Sharma[1]; Kristiina Mark[1]; Eero Talts[1]; Bakhtier Rasulov[1]; Ülo Niinemets[1,2]

[1] Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, Fr. R. Kreutzwaldi 1, Tartu 51006, Estonia; [2] Estonian Academy of Sciences, Kohtu 6, Tallinn 10130, Estonia; *Email: jose.morales@emu.ee

Future climatic disturbances are expected to influence vascular plants in many ways, but how these changes will impact the lichen flora is not clear. Being poikilohydric, lichens possess a major advantage in habitats with highly fluctuating environmental conditions where vascular plants are normally absent. At the same time, they are important components of the carbon sequestration, nitrogen fixation, biodiversity and a wide array of environmental processes, especially in northern ecosystems where warming effects are predicted to increase under the ongoing climate change. Our study aims to assess the physiological responses of different macrolichens and their stress tolerance during simulated cycles of desiccation-rehydration by measuring representative species from arctic, sub-arctic and temperate ecosystems. We use real time monitoring of gas exchange characteristics with a custom-made chamber which allows the immediate rehydration of the samples after desiccation through a built-in spraying system without interrupting the measurement, and simultaneously monitor fluctuations in volatile organic compounds (VOCs) to evaluate holobiont stress response to desiccation and subsequent rehydration. Additionally, algal strains of each lichen are identified to map symbiont phylogeny to holobiont stress resistance levels. We describe different interspecific levels of stress tolerance and their relation with their algal community from a compilation of species in a latitudinal gradient. Our data improves the current knowledge of climate warming repercussions in the lichen vegetation where future shifts are likely to occur under the current global change.