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5th CC 2021 Abstract, *Lecture*

HEAT TOLERANCE OF INTACT SEMI-DESERT CRYPTOBIOTIC CRUSTS DOMINATED BY MOSSES

Mohák dominálta intakt félsivatagi kriptobiotikus kérgek hőmérsékleti toleranciájáról

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The heat sensitivity of plants is closely connected to the thermal stability of PSII. It is more or less clear that the heat sensitivity of the photosynthetic apparatus, and the thermal stability of PSII, can change rapidly. It is also recognized in higher plants that the heat tolerance of PS II is influenced by other stress factors like light and water deficit. In desert and semi-desert conditions parallel with the increase of irradiation and leaf temperature the water content decreases very rapidly in these poikilohydric crusts. To achieve an acceptable dry matter production, an efficient photosynthetic functioning is necessary even under such unfavorable conditions: the combined effects of the three stress factors need to be tolerated at the same time. According to the above mentioned facts, the thermal stability of photosysthetic apparatus was examined under different (light and water deficit) treatments in the mosses (*Didymodon luridus* Hornsch, *Didymodon nicholsonii* Culm, *Grimmia capillata* De Not and *Crossidium squamiferum* Juratzka) dominated intact semi-desert cryptobiotic crusts. Before the measurements the samples were rehydrated and transferred to a growth chamber for two days. Desiccation treatments were carried out by desiccators at given air humidity. For determination of the breakpoints (T_c) of F_0 *vs*. T or F_s *vs*. T curves the method of heat induction of fluorescence was applied.

The relatively low temperature tolerance measured in default state (non-energised thylakoids at full turgor) in the samples was inadequate to survive the thermal conditions of the original habitat. This was also manifested in the heat sensitivity of optimal quantum yield (F_v/F_m) measured in dark-adapted state. At the same time, temperature dependence of the steady-state level of fluorescence, measured in light adapted state, indicated a moderate decrease in heat sensitivity of PS II. Moreover, the water loss of crusts effected an extreme heat-tolerance increase even under moderate continuous light. In parallel with this, the heat dependence of the effective quantum yield of PSII ($\Delta F/F_m'$) measured in samples with a steady-state photosynthesis level also signaled a very high thermal stability. All these facts confirm that the rapid acclimation/acclimatization processes which protect against the simultaneous effects of environmental factors have a pronounced ecological significance and partly explain the survival of the examined crusts even under extreme semi-desert conditions.