

## Project: Investigation of photoinhibition in natural accessions of *Arabidopsis thaliana*

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### Aims & subject of work:

Photoinhibition of Photosystem II (PSII) is a reaction in which both visible and ultraviolet light cause inactivation of the reaction center of PSII. In living photosynthetic organisms the damage is repaired and a new D1-protein is synthesized. Our aim was to investigate the impact of cold-acclimation on photoinhibition tolerance in different native *A. thaliana* accessions from Portugal to Finland. Photoinhibition as well as other physiological parameters, such as CO<sub>2</sub> fixation and singlet oxygen production, were measured both in Brno and in Turku.

### Argumentation of necessity of STSM:

Understanding photoinhibition may help to lengthen the life of PSII-based devices, where photoinhibition is a major problem.

### Workplan/timeschedule followed:

- Photoinhibition measurements from intact leaves with fluorescence camera in Brno.
- Gas exchange, pigment composition and reflectance measurements in Brno.
- Photoinhibition with oxygen evolution measurements in Turku, from thylakoid membranes isolated in Brno.
- Measurements of singlet oxygen production in Turku, from thylakoid membranes isolated in Brno.

### Main results and outcome:

When the plants were first grown two weeks at 4 °C, the tolerance to the damaging reaction of photoinhibition at 4 °C, measured with a fluorescence parameter  $F_V/F_M$ , increased compared to control plants. In the different accessions the rate constants of photoinhibition were 24 %, 29 %, 49 % or 41 % (Rschew, Tenela, Columbia-0, and Coimbra, respectively) smaller after the cold-acclimation. Despite the alleviated photoinhibition, singlet oxygen production at low temperature was not observed to decrease.

