Thermostability and Photostability of Photosystem II of the Resurrection Plant *Haberlea rhodopensis* Studied by Chlorophyll Fluorescence

Katya Georgieva* and Liliana Maslenkova

Institute of Plant Physiology, Bulgarian Academy of Sciences, Acad. G. Bonchev Street, Bl. 21, 1113 Sofia, Bulgaria. Fax: 359-2-873-99-52. E-mail: katya@obzor.bio21.bas.bg

* Author for correspondence and reprint requests

Z. Naturforsch. **61c,** 234–240 (2006); received August 23/September 27, 2005

The stability of PSII in leaves of the resurrection plant *Haberlea rhodopensis* to high temperature and high light intensities was studied by means of chlorophyll fluorescence measurements. The photochemical efficiency of PSII in well-hydrated *Haberlea* leaves was not significantly influenced by temperatures up to 40 °C. F_0 reached a maximum at 50 °C, which is connected with blocking of electron transport in reaction center II. The intrinsic efficiency of PSII photochemistry, monitored as F_v/F_m was less vulnerable to heat stress than the quantum yield of PSII electron transport under illumination (ΦPSII). The reduction of ΦPSII values was mainly due to a decrease in the proportion of open PSII centers (qP). *Haberlea rhodopensis* was very sensitive to photoinhibition. The light intensity of 120 μmol m^{-2} s^{-1} sharply decreased the quantum yield of PSII photochemistry and it was almost fully inhibited at 350 μmol m^{-2} s^{-1}. As could be expected decreased photochemical efficiency of PSII was accompanied by increased proportion of thermal energy dissipation, which is considered as a protective effect regulating the light energy distribution in PSII. When differentiating between the three components of qN it was evident that the energy-dependent quenching, qE, was prevailing over photoinhibitory quenching, qI, and the quenching related to state 1-state 2 transitions, qT, at all light intensities at 25 °C. However, the qE values declined with increasing temperature and light intensities. The qI was higher than qE at 40 °C and it was the major part of qN at 45 °C, indicating a progressing photoinhibition of the photosynthetic apparatus.

Key words: PSII Photochemistry, Chlorophyll Fluorescence, High Temperature Stress, Photoinhibition