

1 *Proceedings*2 **Short-term reaction of *Dionaea muscipula* J. Ellis photosyn-**  
3 **thetic apparatus after UV-A radiation treatment †**4 **Karolina Miernicka <sup>1,\*</sup>, Barbara Tokarz <sup>1</sup>, Wojciech Makowski <sup>1</sup>, Rafał Banasiuk <sup>2</sup>, Aleksandra Królicka <sup>3</sup>, Krzysztof**  
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**Abstract:** *Dionaea muscipula* J. Ellis is a South and North Carolina carnivorous endemic plant with medicinal properties. Its natural habitat is characterized by low availability of nutrients and poor plant cover, resulting in Venus flytrap exposure to various stress factors, especially UV-A radiation. To evaluate response of *Dionaea muscipula* photosynthetic apparatus to increased level of UV-A radiation, plants cultivated in controlled conditions (30–40 % air humidity, temperature  $23 \pm 1$  °C, light intensity  $290 \mu\text{mol m}^{-2} \text{s}^{-1}$ , 16 h light/8 h dark) (Control) were treated additionally with  $50 \mu\text{mol m}^{-2} \text{s}^{-1}$  UV-A radiation for 24 h (Treated). Measurements of gas exchange, chlorophyll fluorescence and photosynthetic pigment content were conducted immediately after the exposure, both in Control and Treated plants. Additionally, the same parameters were evaluated in next 24 hours (Recovery). UV-A treatment (Treated) did not change chlorophyll a + b content and chlorophyll a/b ratio. Furthermore, increased level of electron carriers (Area, Sm) and increased efficiency of electron transport between QA and PSI ( $\Phi R0$ ,  $\delta R0$ ,  $qR0$ ) was observed. Further, PSI and electron acceptors demonstrated increased ability to oxidize reduced plastoquinone pool (VI decrease). As a consequence the rate of net photosynthesis increased significantly. After 24h from the exposure (Recovery) the chlorophyll a + b content declined, but the ratio of chlorophyll a/b did not alter, what indicate decrease in the size of photosynthetic antennas and the number of active PSII centres. Additionally, inactivation of reaction centres (F0 decrease, VJ and VI increase) and decrease in amount of electron carriers, especially PQ pool (Sm) was observed. Moreover, decrease of electron flux and efficiency of electron transport between QA and PSI occurred (decrease of:  $\Phi E0$ ,  $\psi E0$ ,  $ET0/RC$ ,  $ET0/CS0$ ,  $\Phi R0$ ,  $qR0$ ). Results may indicate the decrease of PSII photochemical efficiency. Simultaneously, PSI reactions remained unchanged and the rate of net photosynthesis increased significantly. This can be connected with activation of alternative pathways of electron transport. Activation of these pathways leads to limitation of NADPH synthesis and increase in ATP synthesis, what enable the plant effective acclimatization to stress conditions.

**Keywords:** *Dionaea muscipula*; photosynthesis; photosynthetic apparatus; UV-A radiation; alternative electron transport pathways

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