

Meeting abstract

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## Influence of UV-radiation on the photosynthesis and photosynthetic carbon metabolism in high mountainous plants

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The influence of UV-radiation on the  $^{14}\text{CO}_2$  assimilation rate of three high mountainous plants (*Heracleum lehmannianum* Bunge, *Prangos pabularia* Lind L. and *Lathyrus mulkaka* Lipsky) with different photosynthetic intensity and directivity of photosynthetic carbon metabolism was studied. The investigation was carried out in the Biological Station of The Institute of Plant Physiology and Genetics (Academy of Sciences of Republic of Tajikistan), located on an austral decline (2350 m above sea level) of the Hissar valley (Tajikistan). It is proved, that plants show different responses to dissecting away of UV-rays. Almost tenfold fall in the intensity of  $^{14}\text{CO}_2$  fixation (during 30 sec) is noted for *H. lehmannianum*; in *P. pabularia* there was twofold fall in depression, and in *L. mulkaka* the dissecting away of UV-rays resulted in the minor rising of the photosynthetic rate. Under both film dropping UV-rays and in open area, we have not revealed essential differences in the  $^{14}\text{CO}_2$  assimilation rate in all three plants.

The experiments were carried out in three variants:

1. Control – open place.
2. The plants were covered with polyethylene film.
3. The plants were covered with polyethylene film enriched with 2-oxi-4-alcoxibenzophenol (0.65%), cutting off the UV part of solar spectrum.

The study of  $^{14}\text{C}$  incorporation into the products of photosynthesis has manifested essential differences between investigated plants. From the control experiment, using the *Heracleum* leaves, more than 65% of a label was included into the intermediates of the Calvin

cycle (among them about 20% into PGA). The dissecting away of UV-radiation resulted in a depression of  $^{14}\text{C}$  incorporation into PGA and PES. The key products, which, at 30 sec exposure, concentrated the most part of label were sugars, predominantly sucrose. Intermediates of the glycolic pathway concentrated a small part of  $^{14}\text{C}$  (22%). The depressing of  $\text{CO}_2$  photosynthetic assimilation in *Prangos* was accompanied by a sharp slump of  $^{14}\text{C}$  incorporation into intermediates of the Calvin cycle. The label was found out in sugars predominantly and in intermediates of the glycolic pathway. In control plants we detected an increase of  $^{14}\text{C}$  lobe in monosaccharides. The content of label in intermediates of glycolic pathway decreased. In *Lathyrus* leaves under investigation we revealed intensive label incorporation into intermediates of the Calvin cycle and its decrease in the metabolites of the glycolic pathway. We found minor quantities of  $^{14}\text{C}$  contents in sugars and PEP-products. It is supposed that the UV-rays influence the activity of RUBISCO and other enzymes of the Calvin cycle. The mechanisms of UV-rays influence on carboxylation system and the possibility of their regulatory role in high mountainous plants are under discussion.