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SIGNAL FUNCTION OF ENDOGENOUS HYDROGEN PEROXIDE IN RESPONSE OF PLANTS TO ULTRAVIOLET RADIATION

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Introduction. Endogenous hydrogen peroxide (HP) is the most common and long-lived form of active oxygen and a signal molecule in plant cells. This allows it to be used to evaluate the stress response of mesophyll cells to ultraviolet radiation, that are the main targets of its action. The purpose of our research was to study the dynamics of endogenous HP content in pea (*Pisum sativum* L.) and corn (*Zea mays* L.) leaves due to the effects of chronic irradiation by ultraviolet B (UV-B) radiation.

Methods. Young corn and pea plants with two mature leaves were irradiated with UV-B at dose of 2 and 6 kJ/m² a day with power of 1 W/m² during 12 days. Control plants were protected by glass filter from the UV-B radiation influence. Endogenous HP content was measured in leaves by sulfate-titanium method.

Results. It is established that the effect of chronic UV-B irradiation of pea plants at a dose 2 kJ/m² a day decreased endogenous HP content slightly at the first day of experiment and increased at the second day and then stabilized. Analyses of HP level in corn plants did not detect significant changes in the HP content at doses 2 kJ/m² during the entire period of UV-B treatment. Chronic irradiation of pea and corn plants with UV-B dose 6 kJ/m² a day

caused a double increase in the endogenous HP content on the 3rd and 6-8th days of action. During the 4-5th days of chronic UV-B irradiation exposure at a dose 6 kJ/m² a day HP level decreased.

Discussion. The irradiation dose of 2 kJ/m² per day corresponds to the natural UV-B level for temperate climate territories. Enhanced sensitivity of pea plants to the UV-B radiation is increased by the horizontal orientation of the leaf blades and opened growth point, that caused fluctuations of endogenous HP content in the mesophyll cells and followed by its stabilization. Corn leaves cells were not susceptible to the low dose of ultraviolet radiation, that could be caused by their vertical orientation and closed growth point. Chronic irradiation of pea and corn plants with UV-B dose of 6 kJ/m² per day was stressful as revealed by the sharp changes in the endogenous HP content. The changes in the endogenous HP concentration indicate the changes of cells metabolism and can be a stress marker.

Conclusions. It is shown that the effect of chronic UV-B radiation on pea and corn plants caused changes in the endogenous HP level that is a sensitive indicator for diagnosing the plant stress response to ultraviolet radiation as obligate component of solar radiation.