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TOLERANCE OF *POPULUS ALBA* TO ULTRAVIOLET–B RADIATION

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The Earth's atmosphere is getting polluted by anthropogenic pollutants such as chlorofluorocarbons. As a result, the stratospheric ozone layer is depleting, causing an increase in solar ultraviolet-B radiation on the Earth's surface leading, possibly, to morphological and biochemical alterations in plants. Despite genome stability of all living organisms, the DNA is subject to damage by chemical and physical environmental agents. Fresh air (oxygen) and sunshine (UV) are undoubtedly the two main genotoxic environmental agents for most organisms, and plants are obliged to be exposed to both of these mutagens. UV-B radiation of sunlight penetrates and damages their genome by inducing oxidative damage and cross-links (CPD) that affect growth and development. Nevertheless, plants have developed protective mechanisms to cope with potentially harmful effect of UVB such as screening the solar radiation through the production of UV-absorbing compound, reflecting UV radiation by epicuticular waxes and cuticular structures, scavenging ROS through enzymatic and non enzymatic processes and repairing DNA damages.

The present study, based on a combined approach of gene expression profiling (microarray, qRT PCR) and physiological evaluation of whole plant response (photosynthetic efficiency, morphological parameters, fluorescence microscopy, pigment content, etc.) shows that UVB radiation penetrates plant tissues and induces the down expression of the replication, transcription and translation functions and the slowing down of other molecular processes such as photosystems turnover and electron transport chain. Morphological and physiological parameters strongly support gene expression data. The results here brought show that, close to a situation of total block of cell metabolism (cellular cycle) after an artificial UVB treatment showing a damage additive effect, the cell responds with the activation of different post-translational events that overcome the immediate damage (ROS scavenging) and stimulate modification of leaf ultrastructure and leaf reflective properties (accumulation of phenylpropanoid compounds) up to the reactivation of the same photosynthesis with an overall meaning of acclimation to the stress.