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VARIATIONS IN PEROXIDASE AND CATALASE ENZYME ACTIVITY IN PLUM TREE LEAVES AS AFFECTED BY GROWING CONDITIONS AND THE BIOLOGICAL CHARACTERISTICS OF THE CULTIVAR

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The aim of this study was to determine the effect of water stress on the activity of the antioxidant enzymes catalase and peroxidase in the leaves of plum varieties with different levels of tolerance to soil moisture deficit.

Scientific research was carried out during the growing season, in the lysimeters of the Institute of Genetics, Physiology and Plant Protection of the State University of Moldova on trees of 2 plum varieties of foreign selection – Stanley and President and 2 plum varieties of local origin – Udlinionnaia and Super Prezident, according to the scheme:

1. Experimental variant: plants grown under non-irrigated conditions;
2. Control variant: plants grown under irrigated conditions.

The data obtained are presented as the mean of 3 repetitions ± standard deviation. The processing of experimental data was carried out using a table editor Microsoft Excel 2019.

The results of the investigations revealed an intensification of peroxidase activity in the leaves of trees grown under non-irrigated conditions. Compared to irrigated trees, the values were higher by 24.20 % in the Stanley variety, by 32 % in the Udlinionnaia, by 23.53% in the President and by 3.17% in the Super Prezident. During the vegetation period, the highest activity of the catalase enzyme in the leaves was observed in trees grown under non-irrigated conditions. Compared to trees grown under optimal humidity conditions (with irrigation), the enzyme activity was higher by 16.59 % in the Stanley variety, by 19.74% in the Udlinionnaia variety, by 10.58% in the President variety and by 10.10% in the Super Prezident variety.

The plum varieties studied showed a response to insufficient soil moisture during the growing season, triggering a significant increase in the activity of key antioxidant enzymes (catalase and peroxidase), which represents a plant defense reaction to neutralize oxidative stress caused by drought. Enzymatic activity during the vegetation period did not present constant values, fluctuating depending on the intensity of metabolic processes in different phenophases of tree growth and development, growth conditions and biological particularities of the varieties.

The research conducted reveals that trees of all 4 plum varieties, grown under non-irrigated conditions, have the highest activity of catalase and peroxidase enzymes in the leaves, compared to those grown under irrigated conditions (soil humidity – 70%). Under conditions of water stress (drought), throughout the growing season, increased peroxidase activity was recorded, serving as a marker of resistance to fluctuating environmental factors.

The research revealed a higher activity of the peroxidase enzyme in the leaves of the President variety. In the case of catalase enzyme activity, this law is valid for the Stanley variety. The results obtained can serve as a benchmark for the subsequent development of procedures for modulating the adaptation, growth and development response of fruit species, in the context of climate change.

Keywords: *plum trees, leaves, peroxidase, catalase, water stress*

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