

WATER STATUS AND PHOTOSYNTHETIC PARAMETERS OF SOME LOCAL WALNUT CULTIVARS

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The aim of this study was to determine at the initial stage of fruit development the water status and some photosynthetic parameters of walnut cultivars popular in the Republic of Moldova.

The dry matter content of the kernels was determined by drying the samples to a constant mass at a temperature of 70 °C. The water content (WC) was expressed on a dry weight (DW) or fresh weight (FW) basis. The photosynthetic parameters were measured by the field portable photosynthesis system LCpro-SD (United Kingdom). The main parameters were photosynthetically active radiation (PAR), photosynthetic rate (A), transpiration rate (E), stomatal conductance (g_s) and intercellular CO₂ concentration (C_i). Measurements of leaf photosynthetic parameters and sample collection for determination of WC in the kernels from various walnut cultivars were conducted at the “Gospodarul” SRL walnut orchard (Făleşti District, Republic of Moldova) on July 21, 2025 and 2026.

In both years of the study (2025 and 2026), the value of A was highest for the Chandler cultivar, at leaf temperature 29-31°C amounting more than 11 $\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$. At the BBCH 790 ontogenetic stage, Chandler variety kernels have the highest WC compared to other varieties - 93–96% of FW. The shift of the growing season to a later period in the Chandler cultivar may reduce the harmful impact not only of early frosts but also of major walnut diseases. The variety Pescianski is

widely considered the gold standard of Moldovan-bred walnuts. While exhibiting high photosynthetic activity the leaves of the Pescianski variety are characterized by a lower transpiration rate, enabling more efficient water use. Intercellular CO_2 concentration reflects mesophyll consumption rate vs. stomatal supply. The minimum C_i value was noted in 2026 in the leaves of the Kogălniceanu variety. At the BBCH 790 stage, among the studied cultivars, the lowest water content was observed in the Chernovitski cultivar - 78–79% of FW; the kernels of this one early variety can be recommended for early consumption.

Conclusions. The ‘Chandler’ variety has the highest rate of photosynthesis. At the BBCH 790 ontogenetic stage, ‘Chandler’ variety kernels have the highest moisture content compared to other varieties. The leaves of the Pescianski variety are characterized by a lower transpiration rate. The minimum intercellular CO_2 concentration was noted in the leaves of the Kogălniceanu cultivar.

Keywords: walnut, varieties, leaf gas exchange, kernel water content.

Acknowledgments. This research was supported by the project 25.80013.5107.01TR. ”Eco-farming for innovative protection of new walnut varieties: harnessing methodologies and technologies”, funded by the National Agency for Research and Development.