

## Estimation of stomatal conductance and chlorophyll fluorescence in Croatian grapevine germplasm under water deficit

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### Abstract:

Water deficit profoundly impacts the quality of grapes and results in considerable reductions in crop yield. First symptoms manifest with reduced stomatal conductance and transpiration, accompanied by the wilting of apical leaves and tendrils. So far, there is no available data on the water stress response in Croatian grapevine germplasm. Therefore, objective of this study was to determine influence of genotype and treatment on stomatal conductance (gsw), transpiration (E), electron transport rate (ETR), and quantum efficiency in light (PhiPS2). In this research we observed the initial response to water deficit of 84 unique genotypes, 70 *Vitis vinifera* subsp. *vinifera* and 14 *Vitis vinifera* subsp. *sylvestris* accessions. The experiment was conducted in a greenhouse in both 2022 and 2023, involving self-rooted cuttings exposed to water stress and compared to a well-watered control. Multifactorial analysis of variance was used to examine the effects of genotype, treatment, replicate, date and time of measurement on gsw, E, ETR, PhiPS2. In both years gsw and E were significantly influenced by all parameters except replicate, while ETR wasn't significantly influenced by treatment in second year and PhiPS2 in first year. Due to the observed significance of the interaction between genotype and treatment across all parameters in both years, we employed the pairwise comparisons of treatment levels within each genotype with Bonferroni correction. In this study, a non-destructive high-throughput method for rapid screening of the initial physiological response to water deficit is briefly presented, in which the grapevine genotypes studied are divided into two distinct groups.

**Keywords:** water stress, genotype, stomatal conductance, *sylvestris*, *vinifera*