

Gas exchange in young grapevines Cabernet Sauvignon and Merlot (*Vitis vinifera* L.) under different rootstocks

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The interaction of rootstock-scion can affect the aspects of growth and vigor of grapevines. However the physiological variables involved are still unknown, especially in young vines. The knowledge of these physiological variables can assist in the vineyards management. The aim of this research was to evaluate the influence of rootstocks on the early growth of *Vitis vinifera*, with an emphasis on gas exchange. The research was conducted in 2010-2011, in a greenhouse, and the plants were evaluated in the first vegetative growth cycle. The gas exchanges were evaluated in *Vitis vinifera* cv. Cabernet Sauvignon and Merlot grafted under different rootstocks: Paulsen 1103 (*Vitis berlandieri* x *Vitis rupestris*), Mgt 101-14 (*Vitis riparia* x *V. rupestris*) and SO4 (*V. berlandieri* x *V. riparia*). The experiment was arranged as a 3 x 2 factorial design, completely randomized, with 4 replications and 12 vines per plot. Data were subjected to ANOVA and the means were subjected to multiple comparison tests using the Tukey test at 5% of probability. The following variables of gas exchanges were assessed in two periods of the day at 9am and at 2pm: photosynthesis rate (A), transpiration (E), stomatal conductance (g), intracellular CO₂ concentration (Ci), and leaf temperature (Tf). The water use efficiency and the carboxylation efficiency were calculated, defined by the reasons A/E and A/C, respectively. In the early stages of the grapevines growth, rootstocks-scion combination did not interfere with gas exchange, considering a high water availability conditions and the same foliar area unit. The variation patterns depended on the evapotranspiration demand and on the stomatal conductance according to the time of the day. Independent of rootstock, Merlot variety showed higher stomatal conductance and transpiration in the morning period. In turn, Cabernet Sauvignon presented more water use efficiency.

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