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PHYSIOLOGICAL BEHAVIOR OF TWO AVOCADO CULTIVARS GRAFTED ON THREE CLONAL ROOTSTOCKS UNDER INCREASING DROUGHT CONDITIONS

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The aim of this study was to determine the effect of soil water deficit in gas exchange, water relations and proline production of two avocado cultivars differing in the size of their water conducting systems: 'Colín V-33' (C) and 'Hass' (H), grafted on two year-old clonal rootstocks: 'Colín V-33', 'Fuerte' (F) and 'Hass'. Plants were watered periodically, trying to maintain the useful humidity higher than 70%, and, in order to obtain an increasing water deficit, watering of half of the plants was withheld. Cv. Colin V-33 showed the lowest stomatal conductance with a mean value of $132 \text{ mmol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ in the combinations C/C, C/F and C/H; while cv. Hass and its combinations (H/C, H/F and H/H) maintained a stomatal conductance higher than $150 \text{ mmol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$. In the case of 'Colín V-33', stomatal conductance was reduced from day 7 after watering withholding in the combination C/F, while for C/C and C/H the reduction started from day 12 after the treatment. In the case of 'Hass', stomatal conductance was also reduced from day 7 when 'Fuerte' was the rootstock, while for H/H and H/C, stomatal conductance was significantly reduced from days 8 and 9 after watering withholding, respectively. In watered plants, no differences in water potential (Y_w) were observed when all combinations were analyzed, while in non-watered plants we found that the reduction in water potential diminished when 'Colín V-33' was used as rootstock. In the case of 'Hass', the leaf Y_w decreased significantly in H/H and H/F. On the other hand, when 'Colín V-33' was used as rootstock, the water potential values were similar to those found in watered treatments. Leaf osmotic potential (Y_p) decreased significantly when using 'Hass' as rootstock in the non-watered treatment, being C/H and H/H the combinations with the lowest values (-1.80 and -1.81 MPa, respectively). Leaf turgor potential (Y_r) was not affected by the withholding of watering, although H/H and H/F showed the lowest values (0.28 and 0.26 MPa, respectively). In non-watering conditions, the aminoacid proline accumulated at higher concentrations in all the combinations when compared with watered plants, and again, H/H and H/F were the combinations that showed the highest concentrations with values of 8.21 and $6.46 \mu\text{moles g}^{-1}$ dry weight, respectively.