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Recovery from water stress in laurel plants: influence of short term potassium fertilization

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Plant xylem hydraulic conductance varies with changes in sap solute concentrations, particularly potassium, a phenomenon known as 'ionic effect'. In well-watered *Laurus nobilis* plants, short term potassium fertilization increased xylem sap potassium concentration, resulting in an increase in plant hydraulic conductance (K_{plant}), leaf-specific conductivity of the shoot (k_{shoot}) and transpiration rate (E_{plant}). The ionic effect is enhanced in embolized stems, where it can compensate the cavitation-induced loss of hydraulic conductance. The aim of this work was to test if water-stressed potassium-starved laurel plants could recover earlier from stress when irrigated with a potassium solution instead of water. Two-year-old potted laurel seedlings, grown under potassium-starved conditions, were subjected to water stress by suspending irrigation until leaf conductance to water vapor (g_L) dropped to less than 50% of its initial value and leaf water potential (Ψ_L) reached turgor loss point (Ψ_{TLP}). Plants were then irrigated either with water or 25 mM KCl and measurements were taken at 3, 6 or 24 hours after irrigation. No significant differences were found between the two groups of plants in terms of Ψ_L, g_L, E_{plant}, K_{plant} or k_{shoot}. Analysis of xylem sap potassium concentration showed there were no significant differences between treatments, and potassium levels were similar to those of potassium-starved well-watered plants. In conclusion, potassium uptake or release to xylem appeared to be impaired at least up to 24 hours after relief from water stress, so fertilization after the onset of stress did not result in any short term advantage for recovery from drought stress.