

The effects of different levels of sodium chloride and mycorrhizal colonization on growth, P, K and Na uptake by saffron (*Crocus sativus* L.)

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Abstract

The effect of different levels of salinity arising from sodium chloride on plant growth parameters, phosphorus, potassium and sodium uptake by saffron plant with and without mycorrhiza was studied in a pot experiment. A factorial experiment with a randomized complete block design was performed. The results showed that increasing salinity from 1.5 to 7.5 dS m⁻¹ significantly decreased plant dry weight. The decreased plant dry weight was attributed to the toxicity resulting from high Na⁺ concentration and low K⁺ concentration in plant tissues. Mycorrhizal colonization led to a significant reduction in the concentration of Na⁺ and improved K⁺:Na⁺ ratio, and this in turn, resulted in a considerable increase in plant growth. Percentage of root colonization was not affected by salinity. Despite the reduction of mycorrhizal plant dry weight with increasing salinity, mycorrhizal growth response increased as salinity was increased. Shoot phosphorus concentration and shoot phosphorus content of mycorrhizal plant were significantly higher than those in the shoot of non-mycorrhizal plant. Although shoot phosphorus content decreased with increasing salinity, shoot phosphorus content per unit root length colonized increased as salinity was increased, and this may explain the increased mycorrhizal growth response with increasing salinity. In conclusion, the result of this study, for the first time, showed that saffron has high mycorrhizal dependency, and mycorrhizal colonization alleviated the detrimental effects of salinity on plant growth, uptake of phosphorous and potassium and K⁺:Na⁺ ratio.

Keywords: Saffron, Mycorrhiza, P, Na, K, Salinity