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Growth and Flowering of Two Tuberose (*Polianthes tuberosa* L.) Cultivars under Deficit Irrigation by Saline Water

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ABSTRACT

Tuberose (*Polianthes tuberosa* L.) is one of the most important bulbous ornamental crops of tropical and subtropical areas. The objective of the present study was to determine the interaction effects of salinity and irrigation intervals on growth and flowering of two important commercial cultivars ('Mahallati' and 'Dezfuli') of tuberose (*Polianthes tuberosa* L.). Irrigation treatments consisted of four irrigation intervals 2, 4, 6, and 8 days, and salinity treatments in the irrigation water were *EC* values of 0.7 (control), 1.9, 3.1, and 4.3 dS m^{-1}. This research was carried out in a complete randomized design with factorial arrangement. It can be concluded that tuberose is sensitive to water and salinity stress. In both cultivars of tuberose, vegetative and reproductive parameters were unfavorably affected by these stresses. However, 'Mahallati' was more sensitive to those stresses than 'Dezfuli'. Further investigations are needed to clarify in depth the mechanism of tuberose sensitivity to the studied environmental stresses at both molecular and ultra-structural levels.

Keywords: Abiotic stress, Bulbous plant, Cut flower, Water management.

INTRODUCTION

The amount of water consumed by ornamental plants depends on the particular species and cultivar, the cultivation system, and the plant growing season. It has been estimated that, on average, 100-350 kg of water is needed to produce 1 kg of plant dry matter (Jiménez and Caballero, 1990). Arid and semiarid regions are characterized by limited fresh water resources, while there is increasing evidence of large aquifers of saline water lying beneath many desert regions (Shillo *et al*., 2002). Salinity and drought stresses retard plant growth because osmotic stress conditions restrain water availability at the soil level (Bartels and Sunkar, 2005). Water deficit affects negatively the process of flowering in many plant species by reducing the fertility of newly formed flowers (Slawinska *et al*., 2001). The growth of salt-treated plants is often limited by the ability of roots to extract water from the soil and transport it to the shoot due to the osmotic component of salinity (Rodríguez *et al*., 1997). Sepaskhah and Yarami (2009) indicated that saffron (*Crocus sativus* L.) flower and corm were the most and the least sensitive organ to soil water depletion, respectively. Furthermore, Shillo *et al.* (2002) reported two bulb species, namely, *Hippeastrum×hybridum* Hort. and *Ornitathogalum arabicum* L. that were very sensitive to salinity; and the degree of damage was correlated to the salinity level and this response was expressed as weight reduction in all the plant organs. Moftah and Al-Humaid (2006) indicated that plant biomass, number of leaves, length, and weight of marketable inflorescences and bulb yield of tuberose

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