



The Interaction Effects of Allelopathy and Salinity Stresses on Physiological Traits and Nutrient Uptake in *Poa bulbosa* L. Treated with Arbuscular Mycorrhizal Fungi

ARTICLE INFO

Article Type

Original Research

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How to cite this article

Karami F, Akhzari D. The Interaction Effects of Allelopathy and Salinity Stresses on Physiological Traits and Nutrient Uptake in *Poa bulbosa* L. Treated with Arbuscular Mycorrhizal Fungi. ECOPERSIA. 2020;8(3):139-146.

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Article History

Received: December 29, 2019
Accepted: February 09, 2020
ePublished: September 20, 2020

ABSTRACT

Aims Allelopathy and salinity stresses are known as major abiotic factors which limits the growth and production of plants. Environmental stresses such as salinity and allelopathy can affect the growth and establishment of rangeland species; however the interaction of such environmental stress and inter-plant competition (i.e., allelopathic effects) associated with arbuscular mycorrhiza rarely understood. Therefore, this study aimed to investigate the effect of arbuscular mycorrhiza on physiological traits and nutrient uptake of *Poa bulbosa* L. under the influence of allelopathy and salinity stress.

Materials & Methods A factorial experiment was designed with a completely randomized design with three replications. Factors include allelopathy extracted by *Artemisia persica* Boiss root (treat vs. control), salinity (control, 1, 4, and 8mmol/kg NaCl) and mycorrhizal fungi (mixed and unmixed). The experiment was set up in Malayer University greenhouse in a completely randomized design with factorial layout and 3 replications.

Findings The stem and root of the studied plant species were higher than those found in non-inoculated treatments at low salinity and allelopathy treatments ($p < 0.05$). Also, in severe stress conditions, mycorrhizal dependency was significantly higher (50.87). Proline content does not show variation under all studied treatments ($p < 0.05$). Chlorophyll content decreased significantly with increasing salinity and allelopathy, but in the presence of mycorrhizal fungi, the rate of reduction was significantly lower and mycorrhizal fungi increased chlorophyll well. Plant nitrogen and phosphorus contents also coincided with the mycorrhizal fungi, showing the highest yield (3.7% and 2.6g kg⁻¹ for total nitrogen and phosphorus respectively).

Conclusion The growth, establishment and physiological properties of the *Poa bulbosa* L. are improved under the influence of mycorrhizal application. Thus, the use of mycorrhizal fungi can be a useful biological method to reduce the destructive effects of environmental stresses such as salinity and allelopathy.

Keywords Arbuscular mycorrhizal fungi; Allelopathy; Salinity stress; *Poa bulbosa* L.

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