

Investigating the Alleviation of Water Deficit Stress on Wheat Growth and Yield Using Zeolite and Fungus *Piriformospora indica*

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Abstract

In order to evaluate the effect of zeolite and *Piriformospora indica* fungi inoculation on wheat growth and yield under irrigation cut off condition, a field experiment was conducted in a split-factorial experiment based on randomized complete block design with three replications in the research farm of Agricultural Sciences and Natural Resources University of Khuzestan, during 2016-2017 growing season. Experimental factors were three levels of irrigation cutoff (without irrigation cut off, irrigation cutoff from milky-dough stage and irrigation cutoff from flowering stage) as the main plot and four rates of zeolite (0, 4, 8 and 12 ton.ha⁻¹) and two levels of *Piriformospora indica* fungi inoculation (inoculation and non-inoculation) as sub plots. The results showed that the highest grain yield was obtained under full irrigation condition and application of 12 tons of zeolite per hectare (3849 kg. ha⁻¹), and the lowest was obtained from irrigation cut off at flowering stage and no application of zeolite (1947 kg.ha⁻¹). No significant difference was observed between different levels of zeolite under full irrigation conditions, while in the mild and severe drought conditions application of 8 and 12 tons of zeolite per hectare was advantageous. In irrigation cutoff at milky-dough stage condition, by fungi inoculation, seed yield increased from 3129 to 3647 kg.ha⁻¹. Application of the fungus was effective in irrigation cutoff at flowering stage, such that the grain yield was raised from 2161 to 2917 kg.ha⁻¹. The results of this study indicate that the use of zeolite in combination with soil and inoculation with *Piriformospora indica* fungi can somewhat compensate wheat grain yield damage in water deficit stress conditions.

Keywords: Irrigation cut off, Soil amendments, Endophytic fungus

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