Effects of two arbuscular mycorrhizae fungi on some soil hydraulic properties and nutrient uptake by spring barley in an alkaline soil under greenhouse conditions

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Abstract

In order to investigate the effects of mycorrhizal symbiosis on some soil hydraulic properties and nutrients uptake by spring barley, a greenhouse experiment was conducted based on a completely randomized blocks design with four replications, using two mycorrhizl fungi including *Glomus intraradices* (GI) and *Glomus etunicatum* (GE) and non-mycorrhizal (control) treatments, in an alkaline coarse-textured soil. Results showed that GE and GI significantly increased ($P< 0.01$) field capacity (FC) water content by 24.7 and 12.6%, permanent wilting point (PWP) water content by 20.1 and 11.1%, available water capacity (AWC) by 27.1 and 13.3%, micropores by 14.1 and 5%, mesopores by 27.8 and 20.8% and decreased macropores by 17.3 and 9.5% and saturated hydraulic conductivity by 88.2 and 68.8% relative to the control, respectively. Also, GE and GI fungi significantly increased ($P< 0.01$) uptake of phosphorus in barely seeds by 44.1 and 20.3% and in stem by 181 and 50.6% and potassium in seeds by 290.8 and 167.9%, respectively. It is concluded that mycorrhizal symbiosis, as a biological and sustainable method, improved hydraulic and chemical quality of the alkaline coarse-textured soil.

Keywords: Mycorrhizal symbiosis, Hydraulic conductivity, Pore size distribution, P and K uptake, Alkaline coarse-textured soil.

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