

Effects of drought stress, arbuscular mycorrhizal fungi and rhizobium treatments on nutrients concentration of roots, areal parts and soil in chickpea cultivation

S. Moradi^{1*}, H. Besharati², V. Feiziasl³ and J. Sheikhi⁴

(Received: 29 Dec. 2013 ; Accepted : 9 May 2016)

DOI: 10.18869/acadpub.ejgcs.8.2.13

Abstract

Chickpea (*Cicer arietinum* L.) is one of the Leguminosae family members that has symbiotic ability with *Mesorhizobium ciceri* bacteria and arbuscular mycorrhizal (AM) fungi. To evaluate the effect of AM fungi (*Glomus mosseae*, *Glomus intraradices*) and *Mesorhizobium ciceri* bacteria at three soil moisture levels [28% (field capacity), 15% (-5 bar suction) and 9% (-10 bar suction)] on nutrients concentration of roots, areal parts of chickpea and post-harvest soil, a greenhouse factorial experiment was conducted, arranged as a completely randomized design, in sterilized soil. Results showed that moisture content had significant effect on potassium (K) concentration of roots, areal parts and post-harvest soil; the highest positive effect of moisture was at field capacity level. Rhizobium bacteria had significant effect on concentration of K and nitrogen (N) of the roots, phosphorus (P) of the areal parts, and post-harvest iron (Fe) concentration in the soil. AM fungi had significant effect on root P concentration of the roots; the highest effect was related to *Glomus mosseae*. Interaction of moisture and AM fungi was significant on concentration of root P and areal parts manganese (Mn); the highest effect was related to *Glomus mosseae* treatment at field capacity moisture level. Interaction of moisture and rhizobium bacteria was significant on concentration of root N and P, and areal parts Mn and Fe; the highest effect was related to rhizobium treatment at field capacity moisture level. Interaction of AM fungi and rhizobium bacteria was significant on root P concentration; the highest effect was related to rhizobium and *Glomus mosseae* treatment. The highest root N concentration was related to combination of AM fungi and inoculation with rhizobium treatment at field capacity moisture level.

Keywords: Mycorrhizal fungi, Rhizobium bacteria, Drought, Nutrients.

1. Dept. of Agric., Payame Noor Univ., Tehran, Iran.

2. Soil and Water Res. Inst., Karaj, Iran.

3. Dryland Agricultural Research Institute (DARI), Agricultural Research, Education and Extension Organization (AREEO), Maragheh, Iran

4. Dept. of Soil Sci., Univ. of Tehran, Tehran, Iran.

* Corresponding Author, Email: 6341ms@pnu.ac.ir