Turkish Journal

of

Agriculture and Forestry

Turkish Journal of Agriculture and Forestry

Effect of mycorrhizal inoculation on growth, nitrogen fixation, and nutrient uptake in Cicer arietinum (L.) under salt stress

Neera GARG, Shikha CHANDEL
Department of Botany, Panjab University, Chandigarh 160014, INDIA

Abstract: Most legumes in natural conditions form a symbiosis with arbuscular mycorrhizal (AM) fungi. AM fungi in saline soils have been reported to improve salinity tolerance and growth in plants. In the present study, interaction between mycorrhizal fungus, Glomus mosseae, and salinity stress in relation to plant growth, nitrogen fixation, and nutrient accumulation was evaluated in Cicer arietinum (L.) (chickpea). Two genotypes of chickpea (Pusa-329, salt tolerant, and Pusa-240, salt sensitive) were compared under different levels of salinity with and without mycorrhizal inoculations. Salt stress resulted in a noticeable decline in shoot and root dry matter accumulation, resulting in a decline in the shoot-to-root ratio (SRR) in all plants. However, Pusa-329 was found to be more tolerant to salinity than Pusa-240. AM plants exhibited better growth and biomass accumulation under stressed as well as unstressed conditions. Mycorrhizal infection (MI) was reduced with increasing salinity levels, but the mycorrhizal dependency (MD) increased, which was more evident in Pusa-240. Salinity resulted in a marked decline in the nodule dry weights, whereas a surge in the nodule number was recorded. Nitrogenase activity was reduced with increasing salt concentrations. AM plants had considerably higher nodule numbers, dry weights, and nitrogenase activity under both saline and nonsaline environments. Pusa-329 had a comparatively lower Na^+ concentration and higher K^+ and Ca^{2+} concentrations than Pusa-240. Although nitrogen (N) and phosphorus (P) contents declined with increasing salinity, Pusa-329 had higher levels of N and P as compared with Pusa-240. Plants inoculated with Glomus mosseae had better plant growth and nitrogen fixation under salt stress.

Key words: Cicer arietinum, Glomus mosseae, growth, nitrogenase, nutrients

---

Turk. J. Agric. For., **35**, (2011), 205-214.
Full text: pdf
Other articles published in the same issue: Turk. J. Agric. For.,vol.35,iss.2.