

Effects of Plant Growth Promoting Microbes and Mycorrhizal Fungi on Wheat Growth in the Saline Soil

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Abstract : Arbuscular mycorrhizal fungi (AMF) and plant growth promoting microbes (PGPM) can promote plant growth under saline conditions. This study investigated how AMF and PGPM affected the growth and grain yield of wheat at different soil salinity levels (0, 75 and 150 mM NaCl). AMF colonization percentage, grain yield and dry weights and lengths of shoot and root, N, P K, Na, malondialdehyde, chlorophyll and proline contents and shoot relative permeability were determined. Salinity reduced NPK uptake and malondialdehyde and chlorophyll contents, and increased shoot Na concentration, relative permeability, and proline content, and thus declined plant growth. PGPM inoculation enhanced AMF colonization, P uptake, and K/Na ratio, but alone had no significant effect on plant growth and grain yield. AMF inoculation significantly enhanced NPK uptake, increased chlorophyll content and decreased shoot relative permeability, proline and Na contents, and thus promoted the plant growth. The inoculation of PGPM significantly enhanced the positive effects of AMF in controlling Na uptake and in increasing chlorophyll and NPK contents. Compared to AMF inoculation alone, dual inoculation with AMF and PGPM resulted in approximately 10, 25 and 25% higher grain yield at 0, 75 and 150 mM NaCl, respectively. The results provide that PGPM inoculation can maximize the effects of AMF inoculation in alleviating the deleterious effects of NaCl salts on wheat growth.

Keywords : mycorrhizal fungi, salinity, sodium, wheat

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