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Salt stress tolerant plant species with minimum water, fertilizer requirements, and cultural practices for sustainable agriculture in desert regions and bioremediation/reclamation of desert saline soils to combat desertification

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Abstract

Desertification is one of the greatest challenges facing mankind. Particularly, in arid regions, the rate of desertification is frighteningly high and crop production is alarmingly at high risk. In such circumstances, initiatives should be undertaken to prevent further desertification processes. A wide range of measures, including various reclamation techniques for reducing soil salinity, runoff barrier (i.e., vegetation strips) are developed to prevent further desertification progresses. Among these measures, re-vegetation of the lands, using plant species that are more adapted to the harsh and stressful desert conditions is probably the most effective practice.Halophytes are particularly effective in this regard by reducing soil salinity via removing salts or by utilizing saline waters for their growth. Seashore paspalum and Bermudagrass, true halophytic species, were used in this study to reduce salinity levels of the growth medium by absorption and secretion of the salts from their leaves. Four replications of each salt treatment were used in a RCB design in this experiment. The growth responses of the plants in terms of biomass production were measured under the salinity stress conditions. Results showed both of these plant species, particularly, Seashore paspalum, substantially reduced the salinity levels of the culture medium. Therefore, these species can be recommended for production under arid regions that are characterized with highly saline soils and low quality/saline waters. Consequently, these plant species can effectively prevent further desertification processes in arid regions or in similar regions that are vulnerable and are at high risks of desertification, therefore, biologically combating desertification processes.

Biography

Mohammad Pessarakli has completed his Ph.D. at the age of 32 from University of Arizona and postdoctoral studies from the same University, Soil and Water Sciences Department. He is a Research Professor in the School of Plant Sciences, same University. He has published over120 papers in reputed journals, 20 book chapters, 4reference books: *Handbook of Plant/Crop Stress (1993, 1999,* 2010), *Handbook of Plant/Crop Physiology* (1994, 1999), *Handbook of Photosynthesis* (1997, 2005), and *Handbook of Turfgrass Management/Physiology* (2007), and serving as an Editorial Board member of Plant Nutrition Journal, Communications in Soil Science and Plant Analysis, and Crop Science Book Advisory Committee member.