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BIOLOGICAL TECHNIQUE IN COMBATING DESERTIFICATION PROCESSES USING SEASHORE PASPALUM (*PASPALUM VAGENITUM*), A TRUE HALOPHYTIC PLANT SPECIES

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Abstract

Desertification is one of the greatest challenges facing mankind. Its extent and impact on human welfare and the global environment are now greater than ever before. Particularly, in arid regions, the rate of desertification is frighteningly high and indeed, crop production is at high risk in these regions. In such circumstances, a whole mixture of initiatives should be undertaken to prevent further desertification processes. These initiatives should include soil management, erosion control, reclamation, rehabilitation, which simply seek to halt desertification processes. A wide array of measures, including various reclamation techniques for reducing soil salinity/sodicity and runoff barrier techniques such as vegetation strips are developed to enhance soil productivity and to prevent further desertification progresses. Among these measures, revegetation of the arid lands, using plant species that are more adapted to the harsh and stressful conditions of the deserts is probably the most effective practice owing to its affordability in combating desertification. A permanent vegetation cover is the best protection against desertification. The moment vegetation is destroyed the condition becomes favorable for desertification process to accelerate. Bare areas are much more vulnerable to desertification compared to plant covered regions. Vegetation cover not only prevents desertification process, but also significantly improves soil and, in turn, the environmental condition of the region. Halophytes are particularly effective in this regard by reducing salinity level of the soil via removing the salts or by utilizing saline and low quality waters for their growth. Seashore paspalum (*Paspalum vaginatum* Swartz), a true halophytic plant species, was used in this study to reduce the salinity levels of the growth medium by absorption and secretion of the salts from its leaves. The Sea Isle 2000 cultivar of this species was grown under various NaCl salinity levels (5,000, 10,000, 20,000, and 30,000 mg/l) of the culture medium. Bermudagrass (*Cynodon dactylon* L.), another halophytic plant, variety Tifway 419 was also used as a comparison with Seashore paspalum in this investigation. Four replications of each salt treatment were used in a RCB design in this experiment. The growth responses of the plants in terms of shoot and root lengths and biomass production (fresh and DM weights) were measured under the salinity stress conditions. The salinity levels of the culture medium were measured at the beginning and at the termination of the experiment to evaluate the absorbed salts by subtracting the final salt content of the culture medium from the initial salt contents. The results showed that Seashore paspalum substantially reduced the salinity levels of the culture medium. Therefore, this species can be recommended for production under arid regions that are characterized with highly saline/sodic soils and low quality/saline waters. Consequently, establishment of this plant species in arid regions can effectively prevent further desertification processes in these areas or in similar regions that are vulnerable and are at high risks of desertification, therefore biologically combating desertification processes.