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RESEARCH

Improving Seed Germination of Saltgrass under Saline Conditions

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ABSTRACT

Saltgrass [*Distichlis spicata* var. *stricta* (Greene)] has a great potential for use as a turfgrass and as a revegetation species of saline sites. Experiments were conducted to test the effect of the application of different concentrations of ethephon, fusicoccin, kinetin, thiourea, and Proxy on saltgrass seed germination under three salinity levels. Saltgrass germination percentage was 56% under nonsaline condition, which was reduced to 46 and 26% at 15 and 30 dS m^{-1} salinity levels, respectively. Ethephon application (5 mM) increased saltgrass germination percentage under the highest salinity treatment (30 dS m^{-1}) only. However, Proxy (at 5 mM a.i.) increased saltgrass germination under all salinity treatments, reaching 97, 76, and 40% under control, 15 dS m^{-1}, and 30 dS m^{-1} salinity levels, respectively. Kinetin at 0.5 to 1.0 mM did not increase saltgrass germination under nonsaline conditions but increased germination percentage by 35% at 15 dS m^{-1} and by 89% at 30 dS m^{-1} salinity. Fusicoccin (at 10 μM) and thiourea (at 30.0 mM) also increased germination percentage under all salinity treatments. Our investigation showed that 5.0 mM ethephon, 10 μM fusicoccin, 0.5 to 1.0 mM kinetin, 30 mM thiourea, and Proxy (at 5 mM a.i.) increased saltgrass seed germination under saline conditions. Proxy was the most effective in improving saltgrass germination percentage under saline conditions, followed by thiourea, fusicoccin, ethephon, and kinetin.

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Abbreviations: ABA, abscisic acid; EC, electrical conductivity.

Saltgrass [*Distichlis spicata* var. *stricta* (L.) Greene], native to the western United States, has desirable turf characteristics that include fine texture, good color, and high shoot density. Its biological attributes include tolerance to wear, compaction, drought, and salinity (Fraser and Anderson, 1980; Kopec and Marcum, 2001; Qian et al., 2007). Saltgrass has been classified as a halophyte (O'Leary and Glenn, 1994); it has a great potential for use as a turfgrass of saline sites.

Saltgrass has also been used in revegetation mixtures with alkali sacaton [*Sporobolus airoides* (Torr.) Torr.] to restore mesic or subirrigated saline meadows and riparian sites in the western United States (Lair and Wynn, 2002a, 2002b).

Revegetation by direct seeding could be more effective than planting rhizomes. Establishment and revegetation using saltgrass rhizomes is labor intensive with specialized requirements. Establishment by direct seeding could be more efficient than planting rhizomes (Cluff and Roundy, 1988). However, despite their great salt tolerance after establishment, the germination of many halophytes (including saltgrass) could be inhibited under saline conditions. Previously, seeds of saltgrass accessions were evaluated for

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