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Investigation of water stress on seed germination of two grassland species

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Key words : Water stress, Germination, Tigella, Radicule

Introduction Water stress affects different aspects of plant growth (morphology, physiology and anatomy) and causes many changes such as decrease or delay in germination, aerial organ growth reduction, decrease in dry biomass and in rate of growth, etc. The extent of damage to plant depends on water stress period, soil properties, environmental characteristics as well as plant species.

Regarding the fact that the most sensitive life stage of a plant is germination period that successful passing of this stage seriously affects plant stability and establishment, so this study was carried out on *Artemisia fragrans* and *A. spicigera* because of their importance among medic as well as range plants and as related to their resistance to water stress during the germination period.

Materials and methods

Botanical characteristics *Artemisia* genus belongs to composite family. Most *Artemisia* species are perennial and constitute the vegetation cover of dry and semi-arid regions.

Methods The test was performed in three replications and five treatments. To study water stress, different levels of PEG 6000 were added to Petri dishes equaling to 0, 0.3, 0.6, 0.9 and 1.2 mega Pascal of dryness. It took 28 days for Germination rate in percent, Radicule growth, Tigella growth and Ratio of radicule to tigella to be finally measured.

Results Comparing the replicates in each treatment for either one of the species, the 0.3 mega Pascal treatment benefited from the highest germination rate that was 71% in *A. spicigera* and 53.4% in *A. fragrans*.

Statistical analysis of data through SAS software showed that the effects of treatments on germination, radicul length and tigella length were significant in two probability levels of 1% and 5%. The interaction of different treatments and studied species in germination period and in radicule length was not significant but it was significant for tigella length within two probability levels of 1% and 5%.

Conclusion The results of this research indicated that germination rate, radicule and tigella length decrease with reduction in water potential. The least germination rate, tigella and radicul length were observed in -1.2 mega Pascal treatment while the highest observed in 0.3 mega Pascal. PEG density increase to 6000 osmotic pressure and potential increase could be the reason for the above results.

Based upon the results of this study, it is recommended to use *A. spicigera* as improving species in semi-arid lands.

Reference

Souri, M. 2005. Investigation on Water Stress Effect on Seed Germination of Two Rangeland Spices. MSc. Thesis. Faculty of Natural Resources, University of Tehran, IRAN.