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Effects of irrigation water salinity levels on the germination of rice seed

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Abstract
Ülfet, Gemici, Keshan, Colombia, Köprü-CL and Nirvana cultivars were tested in laboratory conditions in 2021 in order to investigate the effects of irrigation waters prepared at different ECw levels (control, 10, 12, 14 and 16 dS/m) on the germination of rice seeds. The saline irrigation waters were prepared from different salinity sources (NaCl, MgSO4, CaCl2) with a Sodium Absorption Rate (SAR) of 3 and 9. Two separate trials were created according to the "random blocks factorial" trial design with 3 replications. The data obtained from the trials were analyzed using JMP 14 statistical software. The effects of irrigation water salinity levels and the germination rate of rice seeds of cultivars were evaluated by performing variance analysis and student's t test groupings. In the trials conducted with irrigation waters with both SAR 3 and SAR 9 values, it is seen that the tolerance of irrigation water salinity is quite high in terms of germination of all the cultivars in general. Germination rate of Ülfet and Gemici cultivars was higher than other cultivars. Germination rate of Nirvana cultivar was the lowest. This may be due to the fact that the temperature demand of the variety, which is due to the climate structure of the country in which it is registered, is higher than other cultivars and that it is more sensitive to irrigation water salinity. In the experiment with a SAR 9 value, germination rate values close to 100% were obtained in the normal irrigation water application (control), while the 10 dS/m application was in the same group as the control. Sensitivity in terms of germination rate started with 12 dS/m application, and the degree of sensitivity increased depending on the increase in irrigation water salinity level. Similar results were obtained in the experiment with a SAR 3 value. According to these results, it can be said that the rice plant is tolerant of irrigation water salinity up to 12 dS/m level in terms of germination, but it is sensitive above this level.

Keywords: Rice; Sodium Absorption Ratio; Irrigation Water Salinity; Seed Germination