Effect of irrigation water salinity on root traits of two salt-sensitive and salt-tolerant wheat cultivars and its relationship with yield in greenhouse

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Abstract

In order to assess the effect of salinity on root traits and yield of two wheat cultivars, an experiment was conducted in Agricultural, Medical and Industrial Research School, Nuclear Science and Technology Research Institute, Karaj, Iran, using factorial experiment based on complete randomized design with 3 replications. The first factor included sensitive wheat cv. (Tajan) and tolerant cv. (Bam) and the second factor was salinity stress at four levels (6, 8, 10 and 12 dS/ m). In each treatment, 10 days after anthesis, the variation of root dry weight, shoot dry weight, root/stem ratio, and root area and volume were analyzed. The results showed significant reduction ($P \leq 0.01$) in root dry weight, root area and root volume per plant. Root/shoot dry weight ratio decreased 35.1% and 8.2% in Tajan and Bam cultivars, respectively, at 8 dS/m compared to 6 dS/m. Results revealed that grain yield per plant was affected by root dry weight, as the highest grain yield was observed in Bam cultivar. Increased grain yield in this cultivar was due to higher root dry weight. Also, Tajan cultivar had the lowest grain yield and root dry weight in 12 dS/m treatment. There were positive correlations among root surface and volume with root dry weight and therefore with grain yield. Therefore, based on the parameters studied in this experiment, it can be stated that a large part of the traits associated with sensitivity or tolerance of wheat cultivars to salinity could be attributed to their roots' characteristics.

Keywords: Salinity, Root volume, Root surface, Root/shoot ratio.

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