Effect of NaCl salinity on the pattern and rate of root development of blue panic grass (*Panicum antidotale* Retz.)

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Abstract

Identification of growth and development pattern of plant organs, especially the roots, is important to optimal management of halophytes production. In this study, blue panic grass (*Panicum antidotale* Retz.) was planted in a sandy loam soil in plastic tubes and 4-leaf seedlings were exposed to different levels of irrigation water salinities including 0, 10, 20, and 30 dS/m. These salinity levels were produced by dissolving 0, 5, 11, and 20 g of NaCl in one liter of distilled water. In order to investigate the pattern and development rate of different root components, morphological attributes of roots were measured at four stages including beginning of tillering, stem elongation, panicle emergence and seed ripening. Thereafter, the best equations were selected to express the trend of measured root characteristics with time via regression method. The results showed that with increasing the plant age and development of photosynthesis structures, the rate of increase in root weight in non-saline conditions reached to about 70 mg per day at the stem elongation stage. During this period, the rate of root weight increase at the 10, 20 and 30 dS/m salinity levels was 30, 60 and 40 mg/day per plant, respectively. The rate of root weight increase was reduced at different levels of salinity during stem elongation and panicle emergence stages. This reduction was significant at the 10 and 20 dS/m salinity levels. Also, the assimilates allocated to the roots during the seed planting to the beginning of tillering (0-18 days after planting) was about 25, 22, 9 and 10% at the 0, 10, 20 and 30 dS/m salinity levels, respectively. However, the assimilates allocated to the roots at stem elongation (18-35 days after planting) were 34, 21, 25 and 26% at 0, 10, 20 and 30 dS/m salinity levels, respectively. Salinity affected sigmoid development pattern of this plant's roots by reducing the rate of development and size of its components, although different root characteristics showed various sensitivities to irrigation water salinity.

Keywords: Phenology, Halophyte, Root penetration depth, Accumulated root length.

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