

Effect of NaCl salinity and soil waterlogging on growth characteristics of forage corn in greenhouse conditions

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(Received: August 26-2011 ; Accepted: February 28-2012)

Abstract

Salinity and waterlogging are two important abiotic stresses to plants growth and yield in the world. These two stresses can occur simultaneously and have additive effects on plants, including corn, growth. In a greenhouse experiment, the effects of NaCl salinity and waterlogging and their interactive effect on the growth characteristics of forage corn (*Zea mays* cv. single cross 704) were studied. A factorial experiment on the basis of completely randomized design with three replications was performed with two factors of waterlogging period at five levels (0, 2, 4, 8 and 20 days) and soil saturate extract salinity at four levels (0.11, 2, 4 and 8 dS/m). The results showed that the effect of salinity level on fresh and dry weight of shoot and root, ratio of fresh weight of shoot to that of root, leaves chlorophyll index and plant height was significant. By increasing the level of salinity, the fresh and dry weight of both shoot and root, chlorophyll index and plant height were decreased significantly. The effects of soil waterlogging period on fresh and dry weight of shoot and chlorophyll index of leaves were significant but were not significant on fresh and dry weight of root, ratio of shoot fresh weight to root fresh weight, and plant height. By increasing the duration of soil waterlogging, the wet and dry weight of shoot and root, ratio of fresh weight of shoot to that of root, chlorophyll index and plant height were decreased significantly. The interactive effects of salinity and waterlogging on shoot fresh weight and leaves chlorophyll index were significant but were not significant on other measured characteristics. The highest shoot fresh weight was obtained in control treatment and the lowest amount of it was observed in salinity level of 8 dS/m and 20 days after soil waterlogging. The corn shoot growth was more sensitive than its root to salinity and waterlogging stresses. The results demonstrated that even short periods of soil waterlogging (2 days) had considerable long-term effect on the growth characteristics of forage corn.

Keywords: Stress, Corn, Chlorophyll, Salinity, Waterlogging

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