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## Effects of salinity on growth , water status , and ion accumulation in two cool-season turfgrass species

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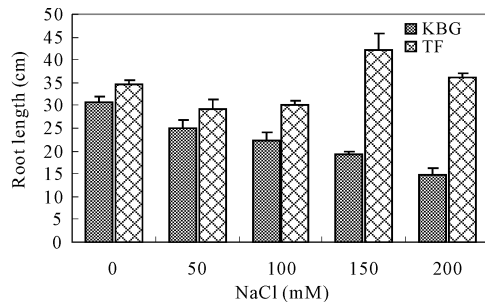
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**Key words :** turfgrass , growth parameters , stress , selectivity ratios , accumulation

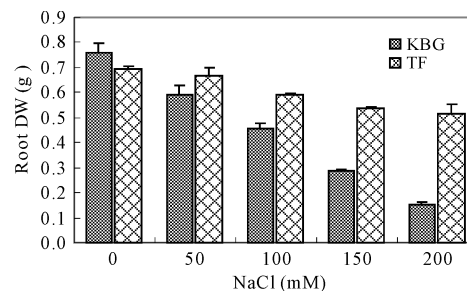
**Introduction** Turfgrass adds beauty to the environment , provides the foundation for many recreational sports , and enhances ecological values (Beard , 1973) . Kentucky bluegrass and Tall fescue are used in home lawns , parks , golf courses , and athletic fields . The objective of this study was to investigate the changes in growth parameters , water status and ionic content of Kentucky bluegrass and Tall fescue , when subjected hydroponically to salt stress .

**Materials and methods** The plants seedlings were grown under non-saline conditions for 15 days to achieve full establishment before starting salt treatment . Then the plants were separated into five groups , and each cultivar was irrigated with a nutrient solution supplemented with different concentrations of NaCl ( 0 , 50 , 100 , 150 and 200mM ) . Salinity treatments were continued for a period of 40 days . Plants growth parameters , water status , and ions content were determined .

**Results** The root length of Kentucky bluegrass was decreased by 52.4% at 200mM salinity treatment , compared to the control . In contrast , however , the root length of Tall fescue increased with increasing salinity , and reached a maximum at 150 mM salinity (Figure 1) . Root dry weight of Kentucky bluegrass decreased as salinity levels increased , but root growth of Tall fescue did not change significantly (Figure 2) . Both species showed a significantly accumulation of Na<sup>+</sup> and Cl<sup>-</sup> under increasing salinity , whereas , K<sup>+</sup> , Ca<sup>2+</sup> and Mg<sup>2+</sup> decreased greatly (Table 1) .



**Figure 1** Effects of NaCl on root length of Kentucky bluegrass (KBG) and Tall fescue (TF) .



**Figure 2** Effects of NaCl on root dry weight (DW) of Kentucky bluegrass (KBG) and Tall fescue (TF) .

**Table 1** Effects of NaCl on Na<sup>+</sup> , Cl<sup>-</sup> , K<sup>+</sup> , Ca<sup>2+</sup> and Mg<sup>2+</sup> contents (mg/g DW) in shoots of Kentucky bluegrass (KBG) and Tall fescue (TF) .

NaCl (mM)	Na <sup>+</sup>		Cl <sup>-</sup>		K <sup>+</sup>		Ca <sup>2+</sup>		Mg <sup>2+</sup>	
	KBG	TF	KBG	TF	KBG	TF	KBG	TF	KBG	TF
0	1.75a	1.49a	12.85a	8.47a	47.80c	45.61a	1.66d	0.97ab	4.55c	4.19a
50	7.64ab	15.78b	24.67b	24.28b	36.87b	38.81b	1.09c	0.93ab	3.91b	3.15a
100	16.48b	22.69d	28.67b	28.34bc	28.89a	33.31b	0.96bc	1.17b	3.15a	3.93a
150	29.95c	19.49c	35.94c	31.06c	33.25ab	35.97b	0.70ab	1.00ab	2.53ab	3.69a
200	45.05d	15.33b	50.79d	25.43b	36.32b	38.37b	0.59a	0.43a	1.58b	3.17a

**Conclusion** Differences responses between Kentucky bluegrass and Tall fescue appear that salt tolerance is associated with higher root growth , higher K<sup>+</sup> selectivity ratios and less Cl<sup>-</sup> accumulation in shoots .