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Salt Tolerance of Sixteen Wheat Genotypes during Seedling Growth

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Abstract: Effect of increasing application of NaCl on germination, root and shoot dry weight at early growth stage, and concentrations of potassium (K) and sodium (Na) was studied in 16 bread wheat (*Triticum aestivum* L.) genotypes grown in nutrient solution. Application of NaCl was carried out at concentrations of 2, 55, 117, 194, and 287 mM. The genotypes showed a wide range of variation for the traits measured under the NaCl treatments. The salt tolerance index (STI) of the genotypes, expressed as the ratio of dry matter yield produced under the NaCl treatments compared to the control treatment, was found to be a reliable criterion for ranking genotypes for their tolerance to NaCl. There was no relationship between the STI values and the shoot Na concentrations ($R^2 = -0.11$). By contrast, shoot K concentrations were very significantly correlated ($R^2 = 0.646^{**}$) with the STI values. Interestingly, some very tolerant genotypes contained similar or higher Na concentrations in shoots compared to the susceptible genotypes. The results indicate that the STI determined by the dry matter production and shoot K concentration is a reliable parameter for ranking genotypes for their tolerance to salt stress. The very poor correlation between the shoot Na concentration and the STI values indicates that the root uptake capacity for K and the tissue tolerance (e.g., Na compartmentation) appear to be important physiological factors contributing to differential salt tolerance among the 16 bread wheat genotypes. This study also identified highly sensitive and tolerant genotypes to excess NaCl treatments (up to 287 mM) and these genotypes could be used in breeding programs and molecular physiological studies for development of high-yielding salt-tolerant bread wheat genotypes.

Key Words: Genotypic variation, potassium, salt stress, sodium, salt tolerance index, wheat (*Triticum aestivum* L.)

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