PHENOTYPIC EXPRESSION OF TETRAPLOID *GOSSYPIUM* TO SALINITY

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Abstract

Salinity imposes abiotic stress during the cotton growing season. Salinity stress causes a series of negative effects on cotton growth, yield, and fiber quality. Although cotton is considered to be only moderately sensitive to saline with 7.7 dS m–1 threshold salinity level before injury occurs, its yield, quality, and seed germination are affected by different salinity levels. Therefore, identification of salt-tolerant genes in cotton germplasm resources is an important aspect for further improvement in cotton production. The objective of this study was to phenotypically evaluate and identify salt-tolerant genotypes of cotton under salt stress. Three tetraploid species, *G. hirsutum*, *G. tomentosum*, and *G. darwinii*, were utilized for identification and manipulation of the level of salt-tolerance compared to cultivated *G. hirsutum* because of their distribution by ocean currents. This implies that they are resistant to salt water. Experiments for phenotypic evaluation of the effects of salinity were conducted at the germination stage in various NaCl concentrations (0, 50, 100, 125, 200, 250 mM NaCl) and at the seedling at 250 mM NaCl. Germination of *G. tomentosum* was completely inhibited at more than 125 mM NaCl while *G. darwinii* was severely inhibited (>72%) at these concentrations. The wild *G. hirsutum* was more sensitive to salt than the cultivated genotypes. Leaf area, shoot length, root length, shoot and root fresh weights were all decreased by salinity. Leaf damage and plant death was major observable response of the plants at 250 mM NaCl. Plant death was most common in AD5. Root length of cultivated AD1 (444RB and DP33B) was increased by salinity, however, shoot and root fresh weight was decreased in all three species. AD1 was the most tolerant to high salinity levels. ST 444RB, DP33B, and LMK-4 were the most resistance to salt at seed germination and at the seedling stage. We found that cultivated *G. hirsutum* was the most salt tolerant.