

**EFFECT OF SALINITY ON GROWTH, ANATOMICAL
STRUCTURE, CHEMICAL COMPOSITION, YIELD AND
GRAIN QUALITY OF TRANSGENIC AND NON-
TRANSGENIC WHEAT (*Triticum aestivum* L.) PLANTS**

By

Safia Mahmoud Abd El-Mgeed Ahmed

**B. Sc. Agric. Sci. (Plant Pathology), Fac. Agric., Cairo Univ., Fayoum Branch,
2004**

A thesis submitted in partial fulfillment

Of

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In

**Agricultural Science
(Plant Physiology)**

Department of Agricultural Botany
Faculty of Agriculture, Fayoum

FAYOUM UNIVERSITY

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SUPERVISION SHEET

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ABSTRACT

A pot experiment was conducted during the two successive seasons of 2009/2010 and 2010/2011 at the Experimental Station of Agricultural Research Center, Giza, Egypt. The aim of this study was to investigate the effect of different salinity levels (0, 5000 and 8000 ppm) on growth traits, anatomical characters, chemical composition, yield and its components and grain quality of transgenic (mannitol-accumulating gene [*mtlD*] for salt stress tolerance genotypes; 79/8 and 235/3) and non-transgenic (cv. Giza 163) wheat plants. The obtained results could be summarized as follows: When compared the line 79/8 and the cv. Giza163, significant positive results were obtained with the line 235/3 under 0 and 5000 ppm NaCl-salinity as compared to the level of 8000 ppm. Irrespective of genotypes, growth traits (No. of tillers plant⁻¹, root size plant⁻¹, No. of leaves plant⁻¹, leaf area plant⁻¹, shoot fresh and dry weights, root fresh and dry weight, and total dry weight plant⁻¹), anatomical characters of stem (section diameter, thickness of ground tissue, No. of cells in ground tissue, diameter of cells in ground tissue, diameter of vascular bundle, No. of vascular bundle and diameter of Mx), anatomical characters of leaves (thickness of blade, thickness of midvein, diameter of vascular bundle and diameter of metaxylem vessels), chemical components (leaf pigments, some photosynthates, nutrient status, enzymatic antioxidants and non-enzymatic antioxidants), yield and its components (No. of spikes plant⁻¹, spike length, No. of spikelets spike⁻¹, No. of grains spike⁻¹, 1000-grain weight and grains weight plant⁻¹) and grain quality (nutrient status of grains, starch, protein and sugars) in 8000 ppm-NaCl-stressed plants were significantly lower than those in 5000 ppm-NaCl-stressed plants. No significant differences in all aforementioned parameters were found out between 5000 ppm-NaCl-stressed and non-NaCl-stressed plants. Regardless NaCl-stress treatments, all aforesaid characters were insignificantly differed between both 235/3 and 79/8 genotypes with preferability in behavior of the former. These two genotypes surpassed the cv. Giza163 in all determined parameters. The interaction effect of NaCl-stress and genotypes treatments was significant. Maximum positive results of all parameters under study were obtained with non-NaCl-stressed plants of the line 235/3 followed by plants of the same line under 5000 ppm NaCl stress or plants of the line 79/8 under no salinity stress or under 5000 ppm NaCl stress. It has been recommended that, the transgenic wheat genotypes; salinity and drought tolerant must be used in wheat cultivation under the climatic changes occurred nowadays which proved to be increased soil salinization and droughts.