BOTANICAL STUDIES ON WHEAT PLANTS (*Triticum aestivum* L.) GROWN UNDER SALINE CONDITIONS AND ITS RESPONSE TO FOLIAR APPLICATION BY SOME ORGANIC SUBSTANCES

By

SHIMAA ABDEL SALAM SHAABAN

B.Sc. Agric. Sci. (General Agric. Prod.), Fac. Agric., Cairo Univ., 2004
M.Sc. Agric. Sci. (Agric. Botany), Fac. Agric., Cairo Univ., 2010

THESIS

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APPROVAL SHEET

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SUPERVISION SHEET

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DEDICATION

I dedicate this work to whom my heartfelt thanks; to my mother and my husband Mohamed Ali and my children for their patience and help, as well as to my sister as well as my husband's family for all the support that they lovely offered along the period of my past graduation.

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ABSTRACT

This study was carried out at Agricultural Experimental Station, Faculty of Agriculture Cairo University and the Environmental Stress Laboratory (ESL), Agricultural Genetic Engineering Research Institute (AGERI), Agricultural Research Center (ARC) Giza, Egypt, during the two successive growing seasons of 2012/2013 and 2013/2014. Aiming to study the effect of salinity on wheat plant and its response to foliar application by some organic substances (salicylic acid, glycine betaine and humic acid). Moreover, the investigations involved also to evaluate the degree of salt tolerance of four wheat cultivars namely; "Sakha93","Gemaza7","Sids1" and "Sids12" and estimating the mono and polymorphism using SSR and RAPD techniques. Results indicated that with increasing salinity levels, plant fresh and dry weight, number of fertile spike, number of tillers, plant height, 1000 grain weight, grain yield were decreased. Foliar application of salinity relief organic compounds at the different salinity levels proved to be more convenient in enhancing the studied traits. Anatomical studies indicated that increasing salinity levels all measurement of stem leaf and root anatomy showed remarkable decreases compared to their respective control. Spraying wheat plant with salinity relief organic compounds induced favorable enhancements in most of included tissues of the stem, leaves and roots. Salinity stress increased soluble sugar in wheat leaves as compared with control. The effect of salinity on plant chlorophyll a, b and carotinoids were a gradual reduction in these characters by increasing salinity level. The main effect of these compounds *i.e*., SA, GB and HA was to compensate the harmful stress occurred due to soil salinity. The obtained results on evaluating the degree of salt tolerance of four wheat cultivars that the genetic similarity among the four wheat genotypes ranged from 58.4 to 90.8. The lowest genetic (mono-morphism) similarity estimate 58.4 was between "Sakha93" and "Gemaza7". In this respect, Genetic similarity matrices among the four wheat genotypes showed that the range of pair similarity coefficient between genotypes was from 62.65 to 91.95. The lowest similarity coefficient 62.65 was observed between "Sakha93" (salinity tolerant) and "Gemaza7" (salinity sensitive), indicating that "Gemaza7" genotype was the most sensitive genotype. While, the two other genotypes "Sakha93" (salinity tolerant) and "Sids1" (salinity tolerant) had the highest similarity value 91.95.

Key words: Wheat, salinity, salicylic acid, glycine betaine, humic acid, amplified DNA, monomorphism, polymorphism.

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