EFFECT OF PUTRESCINE AND HUMIC ACID ON COTTON PLANT GROWING UNDER SALINITY STRESS CONDITIONS

By

MOHAMMAD GAZY ALOBAIDY
B.Sc. Agric. Sci. (Agronomy), Fac. Agric., Aleppo Univ., 2008

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APPROVAL SHEET

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ABSTRACT

This experiment was carried out in the wire house as well as in the Plant Analysis Lab. of the Plant Physiology Section, Faculty of Agriculture, Cairo University, Giza, Egypt, during the two successive seasons (2011 and 2012) to determine the effects of putrescine and humic acid foliar applications on the growth, yield and chemical composition of Egyptian cotton (*Gossypium barbadense* L. cv. Giza 90) plants grown under saline soil conditions. A mixture of soil, clay: sand (1:1), was used as a plant growing media. Three different doses of putrescine (0, 1 and 2 ppm) and humic acid (0, 1 and 2%) were sprayed on plants; plants were sprayed eight times started at the day 45 after planting and repeated every 15 days. Before sowing cotton seeds, 0, 3000, 6000 and 9000 ppm of salt mixture (2 NaCl: 2 $CaCl_2$: 1 $MgSO_4$) were added into soil mixture in each pot. Salinity caused a significantly and gradually decreases in the growth characters, yield and its components and chemical compositions e.g., chlorophyll a, b, total chlorophyll, total carotenoids, N, P and K concentrations by increasing salinity level. While salt stress increased lint percentage, total sugars, total soluble phenols, total free amino acid, proline, Na, Cl, Ca and Mg concentrations. Applications of Put and HA positively affected cotton growth and yield under salt stress conditions. These treatments resulted in increase in morphological characters e.g., (plant height, root length, number of leaves/plant, leaf area/plant, number of fruiting branches/plant, number of flowers/plant, shoot and root fresh and dry weight). Also, Put and HA increase chemical constitutes related to salt tolerance either inorganic, (N, P and K), or organic constitutes e.g., proline, total free amino acids, total sugars, total soluble phenols, chlorophyll a, b, total chlorophyll and total carotenoids, while (Na, Cl, Ca and Mg) as well as lint percentage were decreased. As a result of promoting growth induced by previous foliar applications, yield components e.g.; number of total, open and closed bolls, seed cotton yield and seed index increased. Generally, Putrescine at 2 ppm and humic acid at 1% applications recorded the highest values of growth and yield characters.

Key word: Cotton, Salinity, Putrescine, Humic Acid, Growth characters, Fibers quality

DEDICATION

I dedicate this work to whom my heart felt thanks; to my wife Shefaa and my son Gazy for their patience and help, as well as to my parents, brothers and sisters for all the support they lovely offered along the period of my past graduation.

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LIST OF ABBREVIATIONS

Abbreviation	Meaning of abbreviation
ABA	Abscisic acid
CAT	Catalase
Chl.	Chlorophyll
cm	Centimeter
cv.	Cultivar
DAP	Days after planting
EC	Electrical conductivity
g	Gram
GA_3	Gibberellin
HA	Humic acid
HAS	Humic substances
IAA	Indole acetic acid
LSD	Least significant difference
mg	Milligram
mM	Millimolar
NSCCs	Non-selective cation channels
PAs	Polyamines
PBZ	1-benzylpiperazine
POD	Peroxidase
ppm	Part per million
PPO	Polyphenol oxidase
Put	Putrescine
Spd	Spermidine
Spm	Spermine

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