SOME PHYSIOLOGICAL STUDIES ON WHEAT PLANT GROWING UNDER SALINITY STRESS CONDITIONS

By

SHIREF HASSAN MORGAN
B.Sc. Agric., Cairo University, 2000

THESIS
Submitted in Partial Fulfilment of the Requirements For the Degree of

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APPROVAL SHEET

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Title of Thesis: Some physiological studies on wheat plants grown under salinity stress conditions
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Department: Agricultural Botany.
Branch: Plant Physiology. **Approval: / /2007**

ABSTRACT

Two pot experiments were carried out in the wire house of the Faculty of Agriculture, Cairo University, during the two successive seasons, 2001-2002 and 2002-2003 under different soil salinity levels (0, 2000, 4000 and 6000ppm), as well as field experiment was carried out in Smosta, Baneswaf governorate during season 2003-2004 (under saline soil condition about 4200ppm), to investigate the effect of silicon and boron foliar applications on growth, yield and chemical composition of wheat (*Triticum aestivum* L.) var. Seets 1. In both pot experiments, wheat plants were sprayed twice (40 and 70 days after sowing) by silicon as sodium meta silicate (0, 250 and 1000ppm SiO_2), boron as boric acid (0 and 25ppm B) or its combined mixture. In field experiment, wheat plants were sprayed for three successive times (35, 60 and 85 days after sowing) by silicon (0, 250 ,500 and 1000ppm SiO_2), boron (0, 25 and 50ppm B) or its combined mixture. Under pot experiment two samples were taken at 60 and 90 from sowing, while in field experiment three samples were taken at 45, 70 and 90 from sowing, for growth characters and chemical analysis. Generally, silicon either alone or combined with boron increased most of the studied growth characters as well as yield and its components under both pots and field experiments. A synergistic effect was accompanied spraying of both silicon and boron. Both silicon and boron applications might correct to some extent the negative effect of salinity either on growth, yield or the nutrients uptake by plant. Moreover, under saline conditions of both pots and field experiments spraying silicon alone reduced total free-polyamines, with some exceptions, whereas boron either alone or combined with silicon increased total free-polyamines. Silicon applications either alone or combined with boron under different salinity levels increased gibberellic acid (GA_3) and cytokinins (CK) concentrations but abscisic acid (ABA) was decreased. However, no constant trend could be detected for indole-3-acetic acid (IAA) concentration.

***Keywords**: Salinity, Wheat, Silicon, Boron, Endogenous hormones, Polyamines, Nutrients*

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