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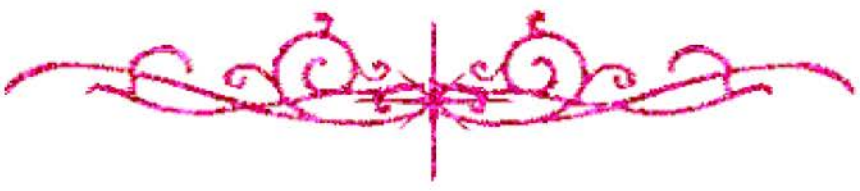

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University of Ain Shams
Faculty of Education
Department of Biology and Geology

COMPARATIVE STUDIES OF SALT-TOLERANCE IN THREE CULTIVARS OF RHODES GRASS

A THESIS

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ABSTRACT

The present study deals with three cultivars of Rhodes grass (*Chloris gayana*) namely, Callide, Pioneer and Katambora. The plants were grown in pots filled with sand cultures and irrigated with different concentration of sea water ranged between 3000, 6000, 9000, 12000 and 15000 ppm. The pot experiments were conducted in a fenced area under the natural conditions at the Faculty of Education, Ain Shams University, Cairo, Egypt.

Relative growth rate (RGR), relative leaf growth rate (RLGR), relative growth of shoot in relation to roots (RSR) and relative growth of root in relation to root (RRR) of all studied cultivars showed significant reduction with increase of salinity. Moreover, the RGR and rooting index of salt-tolerance reflected that the cultivar Callide attained the higher values of salt-tolerance when being compared with those of Katambora and Pioneer at comparable salinity levels.

The increase of salinity resulted in a reduction of transpiration rate and relative water content of leaves of the three cultivars studied. The osmotic potential of leaf sap increased significantly with salinity increase. The accumulation of ash, Na^{+} and Cl^{-} content and reduction of K^{+}, Ca^{++} and Mg^{++} content were the major effects of salinity on the three cultivars studied.

The ions and ash contents of cultivars Callide were significantly lower than Katambora and Pioneer. As a consequence of application of different levels of salinity, there was a negative correlation between the salt-tolerance and the accumulation of proline. The increase of salinity was accompanied by an increase of total protein content (T.P.C) of the different plant parts of the three cultivars studied. As salinity of root medium increased, the contents of chlorophylls a & b decreased and the carotene content increased. The total carbohydrate content (T.C.C) of the different plant parts showed variable changes with the change of salinity levels depending on the type of plant organs of various studied cultivars of salinity while, the lower levels of salinity induced an increase in. The T.C.C reduction in cultivar Callide was lower than those in cultivars Katambora and Pioneer.

Salinity induced an increase of thickness mesophyll and epidermal cells. On the contrary, the increase of salinity brought about a reduction in the number of vascular bundles and the intercellular spaces of the mesophyll.

Key words: Salinity-Rhodes grass.

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