

EFFECTS OF SALT STRESS ON GROWTH PHYSIOLOGY

AND BIOCHEMICAL PARAMETERS OF SELECTED OKRA

(Abelmoschusesculentus L.) CULTIVARS

BY

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ABSTRACT

Salinity is a worldwide problem that limits the growth and productivity of all vegetation and it is going to increase day by day. Studies were conducted at the Agronomy farm of the Eastern University of Sri Lanka to investigate the salinity stress responses of selected okra cultivars on growth, physiological and biochemical attributes. The okra cultivars 'MI5', 'Haritha' and 'EUOK 2' were used for this study during the vegetative, early flowering and fruiting stages. The experiment was laidout in the Completely Randomized Design with 2×3 factorial arrangement and consisted of six treatments and five replications. The plants were subjected to salt stress after 30 days of germination with 100mM NaCl concentration. Irrigation along with half strength Hoagland's nutrient solution was applied to the treatments. The solution was used without salt for the control treatment. Watering was done according to the need of the plants by regularly observing the wetness level of the sand.

Salt stress had significant effect on the growth physiological attributes of the tested cultivars of okra. 'EUOK 2' (10.3 and 10.7%) and 'Haritha' (11.2 and 7.9%) exhibited lower reduction in plant height under salinity during the vegetative and early flowering stages respectively. During the fruiting stage 'EUOK 2' showed 27.7% increase in plant height. The highest reduction was recorded in the 'MI 5' (18, 17.5 and 17%) during the vegetative, early flowering and fruiting stages. 'EUOK 2' showed the lowest reduction (19.7 and 6.1%) in the number of leaves during the early flowering and fruiting stages while the highest reduction was obtained in 'MI 5' (31.7 and 28.6%). The leaf area of the cv 'EUOK 2'showed an increase of 55.2% while the 'MI 5' exhibited a reduction by about 52.5% during the vegetative stage.

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The lowest reduction was found in the 'EUOK 2' (5.5%) under salinity while the highest reduction was observed in the 'MI5' (41.5%) during the early flowering stage. Reduction in the leaf area and the number of leaves due to salt stress showed a lower impact on 'EUOK 2' and the highest reduction in 'MI 5' during the above growth stages was seen in the other two cultivars. The highest reduction in the shoot dry weight was obtained in the 'MI 5' (30.4%) while the lowest one was observed in the 'EUOK 2' 21.3%. The highest increase was noted in the 'Haritha'(10.3%) while the 'EUOK 2' showed a reduction of 29.4% during the early flowering stage. During the fruiting stage, 18.8, 20.8 and 34.6% reduction was observed in the 'Haritha', 'MI 5' and 'EUOK 2' cvs. respectively. Salinity had significant effect on the shoot dry weights of the tested cultivars of okra during the fruiting stage. 'EUOK 2' exhibited a lower reduction in root dry weight (30.3%) while 'Haritha' showed 39% reduction under saline condition.

Salt stress had significant effect on the Relative Water Content, fibre contents and ascorbic acid content of the tested cultivars. The highest RWC was exhibited in the 'EUOK 2' (73.5%) while the lowest one was observed in the 'MI,5' (58.7%). The highest total soluble solids were obtained in the 'EUOK 2' cultivars the lowest values were got in 'MI 5'. The highest fibre content in Haritha (0.9%) and ascorbic acid content in 'MI 5' (10 mg 100g⁻¹) were exhibited while the lowest one were observed in the 'EUOK 2' (0.5% and 3.3 mg 100g⁻¹) respectively .The fresh pod yield was affected significantly with salinity. The highest fresh pod yield (7.4 t ha⁻¹) was obtained in the 'EUOK 2', while the lowest (4.3 t ha⁻¹) was achieved in the 'MI 5'. The highest average weight of pods and girth of the pods were obtained in the 'EUOK 2' while the lowest were found in the 'MI 5'.

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