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EFFECT OF SALINITY STRESS AND ASCORBIC ACID ON PROLINE OF THREE VARIETIES OF CORN

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ABSTRACT

Trial to evaluate the Effect Salinity Stress on Proline and ascorbic acid on corn varieties in a factorial randomized complete block design were performed in triplicate in a greenhouse environment. In this study, proline was assessed. The results showed an increase in salinity proline and proline increased with increasing salt concentration. The amount of proline increased the numbers were different. In other words, in most experimental conditions the highest proline was observed in single cross 704. According to the results, we can conclude the plant response to salinity stress conditions, its salinity increases proline.

Keywords: Corn, Ascorbic Acid, Salt, Proline

INTRODUCTION

Such that corn crops due to its importance in animal feed is very important. The production of high value over the past 40 years as has the production of 25 thousand tons per year to 10.2 million tons. Salinity is one of the main limiting factors for growth and production crops three times the area of the world are facing the problem of salinity, which is three times the total area of land under cultivation and a total of about 27 million hectares of saline and sodic soils is estimated more than half of the land is arable **[1]**.

Approximately 10% of the Earth's surface is covered with a variety of soils and is the dominant sodium chloride. Also, more than 30 percent of land under cultivation and about 30% -50% of the world's irrigated land is affected by salinity located **[2 and 3]**. The soils are approximately one billion hectares of the Earth's surface is covered by 75 million hectares and is located in southwest Asia. In Iran, every year six billion cubic meters of brackish and saline water flows in rivers agriculture is the proper management of water for agricultural use **[4]**.

Continuous plants are affected by environmental factors some of these stresses such as water stress on plant growth and development are limited and one way to increase strength, raising the level of antioxidant enzymes substrates and intracellular antioxidants such as ascorbic acid. It is believed that the addition of ascorbic acid clearing superoxide ions and hydroxyl ions involved in the cleanup. External application of ascorbic acid increases resistance to Salinity Stress and reduces the harmful effects of oxidative stress. Cleansing is the first enzyme superoxide dismutase, which converts superoxide radicals to hydrogen peroxide, which is a non-radical molecule is responsible for the property. Prakyd by catalase and ascorbate peroxidase converts hydrogen and oxygen into the water. Changes in antioxidant enzyme activity in terms of environmental stresses such as Salinity Stress have been reported **[5]**.

Hydroxyl and superoxide radicals directly ascorbate and H_2O_2 to help remove water revives ascorbate peroxidase **[6]**. An important strategy for improving and reforming the harmful effects of salinity on plant can be used as external growth regulators **[7]**.

MATERIALS AND METHODS

To study the effects of salt stress on proline and ascorbic acid maize varieties, the possible mechanisms of salt tolerance, and identify best cultivars of the cultivars tested on three varieties of corn in a greenhouse experiment was done Branch. A factorial experiment based on randomized complete block with three replications. Factors include three varieties of maize (single cross 700 , 704 and 402) and four levels of NaCl salt, NaCl (zero, 75, 100 and 150 mM) and the third factor, ascorbic acid two levels of zero and 0.2 mM, respectively , in the form of a factorial experiment in a randomized complete block design with three replications. The seeds of the same size with 10% sodium hypochlorite disinfectant for 30 seconds and then washed with distilled water 3 to 5 times.

Salinity treatments were virtually the same as the first day of planting during the experiment, soil and water under the pot back into the pot, add the desired amount of salt does not change. Once at the top of the pots were washed with 5 liters of water and re-treatment was performed on soil salinity changes are not achieved. Ascorbic acid is also used to spray the pots were sprayed. Over the course of two pots instead of randomly changing (Random) environmental conditions are the same for all pots.

Measurement of Proline

Bats method for the determination of proline and colleagues (1973) were used. 0.5 g of leaves crushed with a mortar and poured into the tube Sulfosuccinates 3% salicylic acid and 10 ml added and the samples were placed in ice. The tubes at 15,000 rpm for 10 to 15 min at 4 ° C until additional material from solution was centrifuged DeMille then it off and on dimenhydrinate cretonne acid and 2 ml 2 ml of pure acetic acid added after putting in a water bath at 100 ° C were transferred to ice water. 4 ml of toluene was added and after shaking was 20 seconds at a wavelength of 520 nm was read with a high degree of color statistical analysis by ANOVA and by software SPSS (ver.22) was performed comparing the data using Duncan test was performed with 95% confidence intervals. Graphs were plotted using Excel software.

RESULTS AND DISCUSSION

Proline

Investigating the measurement of proline **(Table 1)** showed that salinity levels and cultivars were significant at 1% level.Comparing the mean number of proline compared to 5% by Duncan indicated that the 704 the mean maximum proline accounted for 0.192 and the group was statistically superior and the number 402 mean proline at least 0.153 of the digits **(Figure 1)**.

Comparison of the mean levels of sodium chloride for proline at the 5% level by Duncan showed that the levels of sodium chloride, 150 mM sodium chloride and 150 mM NaCl + Ascorbic acid and 2.0 mM, respectively, with an average of 0.256 and 0.242 highest with an average of 2.0 mM ascorbic acid and proline at least 0.111 of the study showed the levels of sodium chloride **(Figure 2)**.

Oxygenize activity of proline under Salinity Stress reduces Robisko and high levels of salinity on the osmotic regulator (proline) is added plant tolerance to environmental stresses, which can be two pathways may be effective in making proline to one another by using glutamate and ornithine as a precursor pathways in plant and resistance to drought and salinity on proline production Asrafzaysh remain controversial in addition to increased synthesis of proline, proline Katabvlyshm reduction can be attributed to its accumulation at low water potentials **[8]**. Some experiments showed that proline under Salinity Stress is known to be influenced by plant hormones one of the ways that plant adaptation to environmental stresses such as salinity, proline is Smolit considered a form of protection **[9]**.

The proline of the most dominant phenomena has been reported to be induced by Salinity Stress and is involved in stress tolerance mechanisms. The safflower plant has been proven to increase with age and this increase in proline accumulation increased with decreasing soil moisture content, moisture ratio and associated plant, so that is salinity caused a significant increase in leaf proline **[10]**.

Table 1: Analysis of variance examined in a factorial experiment in a completely randomized block design

S.O.V	df	Mean of Square
		Prolin
Levels of sodium chloride (A)	2	0.021**
Genotype (B)	7	0.037**
A × B	14	0.0001
Error	48	0.0002
C.V.%		8.31

*** and ** Significantly at $p < 0.05$ and < 0.01, respectively**

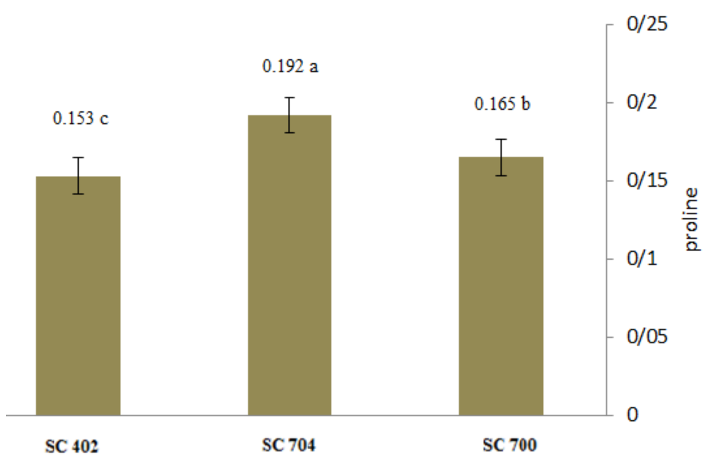

Figure 1: Comparison of cultivars studied proline
Differences between averages of each column which have common characters are not significant at probability level of 5%

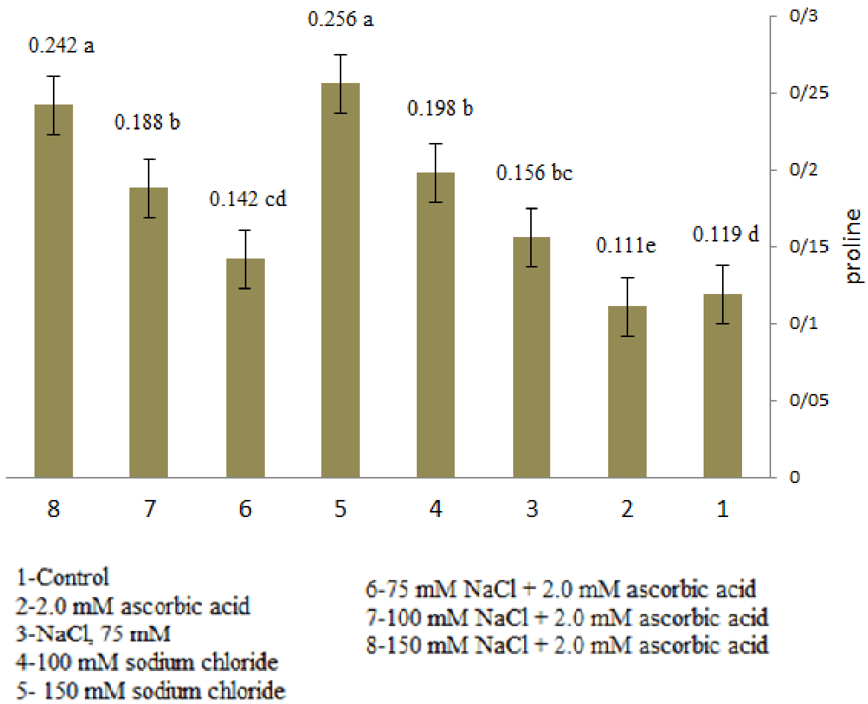

Figure 2: Comparison of the mean levels of sodium chloride for proline
Differences between averages of each column which have common characters are not significant at probability level of 5%.

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