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EFFECT OF IRRIGATION WATER QUALITY AND FOLIAR SPRAYING WITH ASCORBIC ACID AND ASMOSTERASE ON SOME QUANTITATIVE CHARACTERISTICS OF MAIZE YIELD (*ZEA MAYS* L.).

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ABSTRACT

The present investigation entitled Effect of Irrigation Water Quality and Foliar Application of Ascorbic Acid and osmosterase on Maize yield (*Zea mays* L.).The experiment was carried out in spring season 2021 at the field of Ibn Al - Bitar Vocational Preparatory ,Iraq , Karbala . The experiment was laid out in split plot based on Randomized complete block design (RCBD) with three replications .The experiment consisted of Irrigation Water Quality @ (A1,A2 and A3) and Foliar Application of Ascorbic Acid (500 and 750) $mg.L^{-1}$ and osmosterase (300 and 600) $ml.L^{-1}$. The maximum of Grain yield , total yield and biological yield which was recorded (184.0) gm $plant^{-1}$, (9.745 and 4.200) tons. ha^{-1} respectively were recorded in irrigation with river water with 750 $mg.L^{-1}$ of ascorbic spraying ,while The maximum of 500 grain weight and dry weight which was recorded (139.00 g and 2.050 kg.plant $^{-1}$) respectively were recorded in irrigation with water river with 600 $ml.L^{-1}$ of osmosterase

KEYWORDS: Maize (*Zea mays* L.), Irrigation Water Quality, Ascorbic Acid, osmosterase, Grain yield , total yield, biological yield which, 500 grain weight and dry weight

INTRODUCTION

Maize (*Zea mays* L.) ranks third after wheat and rice in the world grain production. Maize as a major source of carbohydrate is used as food, in livestock diet, in the textile industry, pharmaceutical industry, flour industry by mixing it with wheat, vegetable oils industry. As the nutritional content of corn grain depends on several factors, including varieties, agricultural practices and environmental conditions etc. (Kodref and Bev, 1980; Alafeea et al,2019). For the purpose of expanding the cultivation of corn and increasing its productivity, studies and research indicated that the nutrients (micro and macro) spraying on the shoot part of the plant contribute in the vital interactions such as the process of carbon metabolism, which helps to provide these elements for the plant because the leaves play important role in the processes of transpiration and photosynthesis, as well as their relationship to the absorption of nutrients and their distribution throughout the plant (Loutfi, 1986; Lateef et al,2019). Specialists, if they want to expand the cultivation of maize and increasing its productivity, face the problem of lack of irrigation water due to the increase in the rate of population which leads to other problems including the increase

the consumption of fresh water, Where Specialists have warned of the insufficiency of fresh water as a result of the decline in water reserves worldwide (Al-Hayani, 2003;alamery et al,2019).

MATERIALS AND METHODS

The present investigation Effect of Irrigation Water Quality and Foliar Application of Ascorbic Acid and osmosterase on Maize yield (*Zea mays* L.) . It was carried out during spring season 2021 at the field of Ibn Al - Bitar Vocational Preparatory ,Iraq , Karbala. The experiment was laid out in split plot based on Randomized complete block design (RCBD) with three replications. The experiment consisted of Irrigation Water Quality @ (A1.river water,A2. drainage water and A3. Well water) and Foliar Application of Ascorbic Acid (500 and 750) mg.L^{-1} and osmosterase (300 and 600) ml.L^{-1} in addition to the control treatment and their interaction . Ascorbic Acid and osmosterase were sprayed during plant growth at 65 days after planting . The fertilizer N P K were given in the form of urea,tripel supperphosphate and potassium sulfate respectively .

RESULTS AND DISCUSSIONS

500 grain weight

According to analysis of variance (Table 1). (Irrigation Water Quality + Ascorbic Acid with osmosterase spray) had significantly affected on 500 grain weight.The Irrigation Water Quality had significantly affected on 500 grain weight,where Superior (A1) on other treatments which was recorded(132.13) g .The minimum 500 grain weight was noticed with drainage water which was recorded (121.15) g.The Result showed that the Ascorbic Acid and osmosterase spray had a significantly effected on 500 grain weight.The highest 500 grain weight was obtained with C4 osmosterase spray 600 ml.L^{-1} which was recorded (130) g superior over control which was recorded (110.33) g . river water + osmosterase 600 ml.L^{-1} interaction played significant role in affecting 500 grain weight, where superior interaction A1C4 on other interaction which was recorded (139.00) g . The minimum 500 grain weight was noticed with A2C0 which was recorded (102.67)g.

Table 1 shows the effect of irrigation water quality and spraying with ascorbic acid and osmosterase on 500 grain weight (gm).

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
132.13	139.00	133.00	138.20	134.97	115.50	A1 river water
121.15	127.03	123.00	127.00	126.03	102.67	A2 puncture water

124.87	**130.00**	**127.00**	**129.50**	**127.50**	**110.33**	**A3 water well**
0.806	**1.802**					**LS D**
	132.01	**127.57**	**131.57**	**129.50**	**109.50**	**average**
	1.040					**LS D**

Grain yield gm plant^{-1}

The data presented in (Table 2) showed that the Irrigation Water Quality and Ascorbic Acid with osmosterase spray had significantly affected on the Grain yield**.**The The maximum Grain yield was recorded statistically signifigant in Irrigation Water Quality,where Superior (A1, river water) on other treatments which was recorded(170.1) gm plant^{-1}.The minimum Grain yield was noticed with drainage water which was recorded (161.7) gm plant^{-1}.The Result showed that the Ascorbic Acid and osmosterase spray had a significantly effected on Grain yield.The highest Grain yield was obtained with C4 osmosterase spray 600 ml.L^{-1} which was recorded (178.8)gm plant^{-1}, The minimum Grain yield was noticed with control which was recorded (146.6) gm plant^{-1} . interaction between them had significant influence on grain weight, where superior interaction water river irrigation + Ascorbic Acid with 750 mg.L^{-1} on other interaction which was recorded (184.0) gm plant^{-1}. The minimum Grain yield was noticed with drainage water + distill water which was recorded (136.9) gm plant^{-1} .

Table 2 shows the effect of irrigation water quality and spraying with ascorbic acid and osmosterase on the grain yield gm plant^{-1}.

average	**Concentrations**					**water quality**
	C4	**C3**	**C2**	**C1**	**C0**	
170.1	**183.6**	**169.2**	**184.0**	**157.6**	**156.0**	**A1 - what River**
161.7	**147.7**	**161.0**	**173.6**	**162.3**	**136.9**	**A2 puncture water**
166.7	**178.0**	**165.8**	**175.8**	**166.9**	**146.9**	**A3 water well**
4.985	**11.33**					**LS D**
	178.8	**165.3**	**177.8**	**162.3**	**146.6**	**average**
	6.54					**LS D**

Total yield tons ha^{-1}

Result in the (Table 3) indicated that the Irrigation Water Quality + Ascorbic Acid with osmosterase spray and their interactions played significant role in affecting total yield.The The maximum total yield was recorded in Irrigation Water Quality,where Superior (river water) on other treatments which was recorded(9.167) tons. ha^{-1}.The minimum total yield was recorded with drainage water which was recorded (8.569) tons. ha^{-1}.The Result showed that the Ascorbic Acid and osmosterase spray had a significantly effected on total yield.The highest total yield was obtained in osmosterase spray 600 ml.L^{-1} which was recorded (9.461) tons. ha^{-1}, The minimum total yield was noticed with control which was recorded (7.769) tons. ha^{-1} . The interaction played significant role in affecting total yield,where superior interaction river water irrigation + Ascorbic Acid with 750 mg.L^{-1} on other interaction which was recorded (9.745) tons. ha^{-1}.The minimum total yield was noticed with drainage water + distill water which was recorded (7.253) tons. ha^{-1}

Table 3 shows the effect of irrigation water quality and spraying with ascoric acid and osmosterase on the total grain yield tons ha^{-1} .

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
9.167	9.688	8.985	9.745	9.146	8.269	A1 river water
8.569	9.260	8.523	9.200	8.599	7.253	A2 puncture water
8,834	9.433	8.788	9.318	8,847	7.785	A3 water well
0.0429	0.0960					LS D
	9.461	8.769	9.421	8.864	7.769	average
	0.0554					LS D

Dry weight Kg

Table (4) shows that the Irrigation Water Quality and Ascorbic Acid with osmosterase spray had significantly affected on Dry weight.The Irrigation Water Quality had significantly affected on Dry weight,where Superior river water on other treatments which was recorded(1.800) kg .The minimum Dry weight was noticed with drainage water which was recorded (1.4000) kg.The Result showed that the Ascorbic Acid and osmosterase spray had a significantly effected on Dry weight.The maximum Dry weight was noticed with C2 and C4 which was recorded (1.867) kg. The minimum was recorded (1.083) kg was obtained with control . The interaction played

significant role in affecting Dry weight, where superior interaction A1C4 on other interaction. The minimum Dry weight was noticed with A2C0.

Table 4 shows the effect of irrigation water quality and spraying with ascorbic acid and osmosterase on the dry weight of the plant (kg).

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
1.8	2.050	1.950	2.100	1.700	1.200	A1 water rushing
1.4	1.650	1.350	1.650	1.350	1.000	A2 puncture water
1.625	1.900	1.775	1.850	1.550	1.050	A3 water well
0.0542	0.1212					LSD
	1.867	1.692	1.867	1.533	1.083	average
	0.0699					LSD

biological yield tons ha^{-1}

results revealed that the effect of Water Quality and Ascorbic Acid with osmosterase spray and their interaction had significantly affected on biological yield was statistically significant (Table 5). Irrigation Water Quality had significantly affected on biological yield, where Superior river water on other treatments which was recorded(3.600) tons.ha^{-1}.The minimum of biological yield was noticed with drainage water which was recorded (2.800) tons.ha^{-1}.Ascorbic Acid with osmosterase spray had a significantly effected on biological yield.The maximum biological yield was obtained with Ascorbic Acid 750 mg.L^{-1} which was recorded (3.733) tons.ha-1. The minimum was recorded (2.167) tons.ha^{-1} was obtained with control.The interaction between them had significant influence on biological yield, where superior interaction water river irrigation + Ascorbic Acid with 750 mg.L^{-1} on other interaction which was recorded (4.200) tons. ha^{-1}. The minimum biological yield was noticed with A2C0 drainage water + distill water which was recorded (2.00)

Table 5 shows the effect of irrigation water quality and spraying with ascorbic acid and osmosterase on the biological yield of the plant tons ha^{-1} .

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
19,088	21,730	20,670	22.260	18,020	12,720	A1 river water
14,840	17,490	14,310	17,490	14,310	10.600	A2 puncture water
17.225	20.140	18,815	19,610	16,430	11.130	A3 water well
9.617	24.89					LS D
	19,726	17.930	19,780	16,253	11,483	average
	14.37					LS D

CONCLOSION

Based on the result of experiment it was aimed to identify suitable treatment for Maize with respect to yield of Maize during spring season2021 . it may be concluded that the treatment irrigation with river water with 750 mg.L^{-1} of ascorbic spraying was recorded the best among treatments combinations on Grain yield , total yield and biological yield which was recorded (184.0) gm plant^{-1} , (9.745 and 4.200) tons. ha^{-1} respectively ,while The maximum of 500 grain weight and dry weight which was recorded (139.00 g and 2.050 kg.plant $^{-1}$) respectively were recorded in irrigation with water river with 600 ml.L^{-1} of osmosterase

DISSCUSIONS

The integration of irrigation Water Quality and Ascorbic Acid with osmosterase combination was found significant in increasing yield than control. The reason for this decrease may be due to one of the mechanisms that controls the activity of (H+-ATPase) in the plasma membrane of root cells. It is a mechanism of transfer and absorption of optional potassium and sodium ions, which is one of the mechanisms that plants use to adapt to reduce the damage caused by high salinity. The reason as indicated by (Fahd *et al*., 2005; Alamery et al,2018)), may be due to the possibility of a decrease in grain yield due to an increase of electrical conductivity. The reason may be due to the high ratio between N and K in the leaves, which is a measure of the plant's resistance to salinity. The presence of nitrogen and potassium here in a high percentage in plant tissues is evidence of that, and this was explained by (Khorshidi *et al*., 2009) and this agrees with (Turan, 2009 and Rajpar, 2011). The reason for that the high concentration of sodium in plant tissues leads to a loss of potassium from the cell, or may lead to an increase in competition between sodium and potassium in performing the vital functions of the plant cell. And therefore, the effect of the irrigation water salinity led to a significant decrease in the indicators of yield and its components.

As for ascorbic spray and osmosterase spray. The reason for the superiority of the averages of treatments in increasing the dry weight may be due to the direct effect of spraying with ascorbic acid and osmosterase or to the efficiency of the leaves in the direct absorption of nutrients (calcium and nitrogen) that make up the osmosterus and vitamins (ascorbic acid), and this is agree with what was found by (Marcinska, 2001). The superiority in the weight of 500 grain may be due to spraying of ascorbic acid with osmosterase and what it provide plant with vitamins, proteins, amino acids and nutrients, as well as the important role it plays in the transfer of carbohydrates, starches and sugars at the right time These results are agree with what was found by (Al-Saidi, 2002, Abu Dahi and Mohammed, 2013 and Al-Halfi and Zuboon, 2016).

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