

## EFFECT OF IRRIGATION WATER QUALITY AND FOLIAR SPRAYING WITH ASCORBIC ACID AND OSMOSTRAS IN SOME PHENOTYPIC TRAITS OF CORN COB IN YELLOW CORN (*ZEA MAYS L.*)

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### Abstract

A field experiment was conducted in the spring season of 2021 M at Ibn Al-Bitar Professional High School located in the Al- Otaishi area of Al-Hussainiya district of the Holy Karbala governorate in Iraq to study the effect of irrigation water quality and foliar feeding spraying with ascorbic acid and oosmostras in some phenotypic traits of the corn starch *Zea mays L* . The design of the randomized complete sectors (RCBD) and the arrangement of the split panels was chosen as a factorial experiment with two factors, as the first factor included the quality of irrigation water in three levels (A1). and A2 and A3 while the second factor was foliar spraying on the foliage of maize plants with two concentrations of ascorbic acid (500 mg L<sup>-1</sup> and 750 mg L<sup>-1</sup>) as well as spraying with two ,(concentrations of osmostras 300 ml L<sup>-1</sup> and 600 ml L<sup>-1</sup> ).in addition to the comparison treatment, which is spraying with distilled water for one time only And by three replications. Results of the interaction between factors A indicated water quality and C foliar feeding ( spraying with ascorbic and Osmostras) the results showed the superiority of , the treatment A irrigation with river water and ( spraying ascorbic 750 mg.L<sup>-1</sup>) in the following studied traits( corn cob length 21,677 cm and corn cob diameter 4.267 cm and the total number of grains in corn cob 676.7) grains.

**KEYWORDS:** Maize (*Zea mays L.*), Irrigation Water Quality, Ascorbic Acid, osmostrase, Grains , corn cob length , corncob diameter , the total number of grains.

### Introduction

Maize *Zea mays L* . An important cereal crop that ranks third in the world for strategic crops after wheat and rice in terms of cultivated areas, production and importance ,Al-Yunus1993; Alafeea et al,2019) When following up on the production rate per unit area in Iraq and noting . that it is low compared to the global production rate, it became necessary to work on increasing production efficiency and to think of radical solutions to overcome the low rate of production in Iraq. Specialists began to demand the use of alternatives to overcome this problem low production rate), but one of these. The alternatives are the use of poor water sewage and industrial water, as well as water from wells and sewers) to achieve comprehensive agricultural development. Al-Douri(1994) and Khoury(1996; Lateef et al,2019) Also, the use of modern technologies . modern mechanization and irrigation water management using modern methods and the addition of fertilizers of all kinds is one of these solutions used for the purpose of reaching the top of production, as maize is one of the crops with a high environmental adaptability. It can also reach the top of production through many Among the agricultural service operations, which come in the forefront of all kinds and forms of fertilization Saad Allah et al ( 1998; Alamery et al,2019) .

One of the successful means to overcome the low production when irrigating with salt water is ,the means of supplying the plant with nutrients and growth regulators through foliar feeding which means spraying fertilizers on the vegetative system to provide it with all the requirements for growth. As ,Abdoul(1988) indicated that the plant can be supplied from its nutrient needs by through foliar feeding %85.

## **Materials and working methods**

### **experience site**

Otaishi area of Al -Hussainiya district of the Holy Karbala governorate in Iraq to study the effect-of irrigation water quality and spraying with ascorbic acid and paloosmostras in the growth and yield of yellow maize *Zea mays* L .

### **Experimental design and agricultural operations**

The randomized complete block design RCB D was selected as an experiment A factor of two factors, the first factor included the quality of irrigation water at three qualities A1 ,A2 and A3 while the second factor was foliar spraying on the vegetative total of maize plants, represented by spraying with two concentrations of ascorbic acid (500 and 750) mg L<sup>-1</sup> And spraying with two concentrations of Osmostras (300 and 600 ) ,ml liter<sup>-1</sup> In addition to the comparison treatment which is spraying with distilled water for one time only. With three replications.

- Foliar fertilization( foliar feeding) ascorbic acid has been adde and Osmostras ) with two concentrations of each, as well as spraying with distilled water (as a comparison treatment and only once in the stage of the emergence of silk after 65 days from the date of planting

## **Results and discussion**

### **Results**

#### **Corn Cob length (( cm))**

In Table( 1 ) the results indicate significant effects of water quality and foliar feeding spraying with ascorbic acid and osmostras as well as the overlap between them in the length of corn cob of maize plants. The results of the first factor(water quality ) show that there is a significant effect in the length of corn cob ,between the averages of the irrigation water quality treatments as the mean of treatment A river water) outperformed, and the highest value of corn cob length was recorded.which amounted to 20,533 cm .

The results indicated that treatment A2 ( puncture water) recorded the lowest value for corn cob length , which amounted to 19,533 Cm . The results of the second factor also indicated foliar feeding( spraying with ascorbic acid and osmostras) indicated that there was a significant effect on the length of corn cob as the highest value recorded in the average length of , corn cob was cm 21.333) when treatment C4 average spraying with osmostras (600 Ml . Liter<sup>-1</sup> ) While the . lowest value of corn cob length was recorded at C0 treatment . comparison treatment spraying The with distilled water reached 18.556 cm . The results indicated that there was a significant effect in the length of corn cob when the interaction between water quality and foliar feeding (spraying with ascorbic acid and Osmostras the interaction between the first factor and the second factor. ( The results showed that the highest value of corn cob length was achieved with the A1C2

treatment ( ascorbic spray treatment ( .750 amalgam Liter<sup>-1</sup>) when irrigating with river water Which amounted to 21.667 cm While the lowest value recorded for the length of corn cob when the treatment A2C0 (The treatment of spraying with distilled water (the comparison treatment) when irrigating with drip water ).

**Table 1 shows the effect of irrigation water quality and spraying with ascorbic acid Osmostras in the length of corn cob(cm)**

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
20,533	22,000	20,000	21.667	20,000	19.9000	A1 river water
19,533	21,000	19.333	20.333	19.000	18,000	A2 puncture water
20.200	21,000	20,000	21.333	20,000	18,667	A3 water well
0.4607	1.0301					LS D
	21.333	19,778	21.111	19,667	18,556	average
	0.5948					LS D

### Corn Cob diameter (cm)

The results of Table(2) show that there are significant effects of the first factor and the second factor, as well as the interaction between them irrigation water quality and foliar feeding spraying with ascorbic acid and oosmostras and the overlap between them in the diameter of one corn cob in maize plants. The results of the first factor( irrigation water quality ) show that there is a significant effect in corn cob diameter , as it reached the highest value recorded for the average corn cob((diameter when treatment A1 River water. Its value was 4,027 cm. While the lowest value recorded for the average corn cob diameter at treatment A2 puncture water . ( Its value was 3.833 cm) .. As evidenced by the results of the second factor, nutrition spraying with ascorbic acid and osmostrias to a significant effect in the diameter of corn cob .

The highest value of the average cob diameter was achieved when treatment C2 spray with ascorbic acid 750 amalgam; Liter<sup>-1</sup> and its value was 4.100 cm And that the lowest value of the average cob diameter was recorded at the treatment C0 The comparison treatment , spraying with distilled water) its value was 3.656 cm).

In addition to the above showing the results. We note that the results of the interaction of the first and second factors the interaction between water quality and foliar feeding by spraying with ascorbic acid and osmostria had a significant effect on the diameter of corn cob As the highest value was 4.267cm and recorded upon treatment A1C2 ( spraying with ascorbic acid 750

amalgam Liter<sup>-1</sup> ) when irrigating with river water ), while the lowest value was <sup>1-</sup> 3.533 cm) and it was recorded when treatment A2C0 spraying with distilled water when irrigating with drip (water).

**Table 2 shows the effect of irrigation water quality and spraying with ascorbic acid Osmostras incorn cob diameter (cm).**

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
4.027	4.100	3.967	4.267	4.067	3.733	A1 water River
3.833	4.033	3.733	4.033	3.833	3.533	A2 water puncture
3.867	3.967	3.833	4.000	3.833	3.700	A3 water a well
0.0634	0.1417					LS D
	4.033	3.844	4.100	3.911	3,656	average
	0.0818					LS D

**Number of rows in the cornice**

The results of Table(3) indicate that there are significant effects of water quality and ascorbic acid spraying Osmotraces and the interaction between them, in the number of rows in the cornice. The results indicated that the highest average number of rows in the cornice was .of maize plants and its value wa ( achieved when irrigation was treated with river water ( A1(17.600 row ) . While the lowest value of the number of rows in the cornice was recorded when irrigating with drainage water A2 and its value was (16,200 ).Describe Also, the results related to the second factor of foliar feeding spraying with ascorbic acid and Osmostraces in the table indicate the highest average number of rows in corn cob ( as it reached 17.222 rows) when treated with concentration C2. The results also indicate that the lowest value of . ( spraying with ascorbic acid 750 mg. L<sup>-1</sup> the average number of rows in the cornice was recorded in the comparison treatment C 0 ) spraying with distilled water) and its value was16.222 rows)The results of the interaction between the first and second factors in the table indicate that the highest value of the average number of rows in the cornice(18.000 rows) recorded at treatment (A1C0 spraying with distilled water when irrigating with river water. As for the lowest value recorded for the interaction between the first and second factors, it was 15,000 . Describe at treatment A2C0 spraying with distilled water when irrigating with purifying water.

**Table 3 shows the effect of irrigation water quality and spraying with ascorbic acid And . osmostras the number of rows in the cornice**

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
17.600	17.667	17,333	17.667	17,333	18,000	A1 river water
16.200	17.000	16,333	16,667	16.000	15,000	A2 puncture water
16.600	16,667	16,667	17,333	16,667	15.667	A3 water well
0.3576	0.7996					LS D
	17.111	16,778	17.222	16,667	16.222	average
	0.4617					LS D

#### Number of grains per row (one grain)

Table(4) shows that there are significant effects of water quality the first factor and the second factor, foliar feeding spraying with ascorbic acid and osmostras and the interaction between them in the number of grains per row for maize plants.

The results of the first factor( water quality) show that there is a significant effect on the number of grains per row and that the highest value of the average number of grains per row was achieved when the treatment A3 (well water) when it reached (38.20 grains) On the other hand , treatment . A2 ( puncture water)recorded the lowest achieved value, as it reached (35.00 grains) The results . of foliar feeding are the second factor spraying with ascorbic acid and Osmostras showed that there was a significant effect on the number of grains in a row and that the highest value recorded for the average number of grains in a row was at treatment C2 spraying with ascorbic acid 750 mg. liter<sup>-1</sup> with a value of 37.22 grains While the treatment was C3 spray Pallasmostrasse 300 Ml . L<sup>-1</sup> recorded the lowest average number of grains in the row, as it reached 35.11 grains. The results in the table due to the interaction between factor one and factor two indicated that there was a significant effect on the number of grains in the unit row, and the highest value was recorded when treatment A3C1 irrigation with well water and ascorbic acid spraying (500 amalgam Liter<sup>1</sup> ) It reached 39.33 grains While the lowest value was recorded with the treatment A2C4 ( irrigation with drenching water and spraying with osmostrases 600 Ml Liter<sup>-1</sup> when it reached ( 34.00 grains ).

**Table 4 shows the effect of irrigation water quality and spraying with ascorbic acid Osmostras in the number of grains per row ( grain).**

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
36.20	36.67	36.00	38.00	36.00	34.33	A1 river water
35.00	34.00	34.67	34.67	35.00	36.67	A2 puncture water
38.20	39.00	34.67	39.00	39.33	39.00	A3 water well
1.448	3.238					LS D
	36.56	35.11	37.22	36.78	36.67	average
	1.869					LS D

**The total number of grains in corn cob : ( grain)**

Among the table(5) There are significant effects of water quality and foliar feeding spraying with ascorbic acid and oosmostras and the interaction between them in the total number of grains in corn cob of maize plants. The results of the first factor (water quality) showed that there was a significant effect of the total number of grains incorn cob and the treatment , A3 the average of the well water treatments was the treatment that recorded the highest mean of the total number of grains in corn cob ( with a value of 644.9 grains) .. While the lowest average total number of grains incorn cob was recorded when treatment A3 ( puncture water) reached ( 560.5 grains). The results of the second factor also showed foliar feeding spraying with ascorbic acid and Osmostras that there is a significant effect of the total number of grains in corn cob.

The highest value of the average total number of grains was achieved when treatmentC2 ( Spray treatment with ascorbic acid 750 mg. Liter <sup>-1</sup>) Its value w .(643.2 grains) . The results showed that the lowest value achieved was at treatment C0 ( spray treatment with distilled water. Its value was 587.9 grains) The results of the interaction between the first factor .( water quality) and the second factor were foliar feeding( spraying with ascorbic acid) and Osmostras in the table shows . that there is a significant effect of the total number of grains incorn cob The results showed that . the highest value recorded for the total number of grains in corn cob when the treatment( A1C2 treatment of spraying with ascorbic aci) (750 amalgam <sup>-1</sup> liter ) . when irrigating with river water Its value was (676.7 grains The results showed that the lowest value was recorded for the total number of grains incorn cob at the two treatments A 2C1 and A2C0 . Treatment of spraying with distilled water when irrigating with puncture water and spraying with ascorbic acid with a concentration of 500 mg. L <sup>-1</sup> when irrigating with puncture water) respectively, which amounted to 535.0 grains ).

**Table 5 shows the effect of irrigation water quality and spraying with ascorbic acid and osmosterese in the total number of grains in Cornus((grain))**

average	Concentrations					water quality
	C4	C3	C2	C1	C0	
639.3	653.0	622.0	676.7	627.0	618.0	A1 river water
560.5	578.0	577.3	577.3	535.0	535.0	A2 puncture water
644.9	649.7	633.0	675.7	655.3	610.7	A3 water well
9,82	21.96					LS D
	626.9	610.8	643.2	605.8	587.9	average
	12.68					LS D

### Discussion

Indicators of phenotypic characteristics in corn cob- :

The tables of phenotypic traits indicators incorn cob tables numbered from Table No. 1 to Table No. 5 indicate the superiority of the average treatment A1 (river water) and this superiority may be due to the positive effect of the increase in plant height and increase in plant shading through the increase in the area Foliar, which in turn leads to an increase in the transfer of nutrients from the leaves and stems to the seeds transfer of nutrients from the source to the estuary, as well as the reason may be the increase in the fertilization rate of seeds and this is consistent with what was reached Kumaran (2001 ; Alamery et al,2018) .

The results of the second factor C ( paper feeding) as well as the interaction between the first and second factors (A and C ) indicated .a significant effect between the averages of the treatments The reason for the increase in the number of grains may be due to the plant’s resistance to salinity and the presence of free radicalsROS which are the electronic transport chain in the mitochondria and the carbon representation as a source of it, which makes the seeds grow and develop through the processes of carbon metabolism and respiration Mitter(2002) . The plant’s resistance to salinity may also be due to the division of cells involved in the stages of their formation or their ,protection from oxidation, to the length of metabolic activity throughout the period of seed growth as well as the fact that the moisture content of seeds is different in the stages of seed growth and as a result, the sources of free radicalsROS are different from one stage to another from The stages of seed growth Bailly (2004) The reason for this discrepancy and the difference in the phenotypic characteristics ofcorn cob in all treatment averages may be due to the presence of free radicalsROS formed by increased salinity and its high percentage in the irrigation water A2 and

well water A3. This increase in the indicators of the studied phenotypic growth characteristics can be attributed to the fact that the plant cells are positively affected and the division processes increase, and thus there is an increase in the length of corn cob and its circumference, which leads to an increase in the number of rows in corn cob and an increase in the number of grains when they absorb the nutrients found in the materials used for feeding Paper, which may be the reason for the increase in the number of grains formed on the rows of corn cob as a result of the fact that pollen grains are ready for pollination due to the increased division of silk cells in the upper peripheral region of ( corn cob ) and this is consistent with what was reached Anjum ,et al(2015) . The reason for the increase in the indicators of phenotypic growth characteristics may be due to the efficiency of absorbing the leaves of osmostras containing calcium and amino acids, and thus the efficiency of increasing its accumulation in the tissues of the plant, which leads to an increase in the fertilization rate in seeds and an increase in the number of grains, and this is consistent with ,what was reached Hashem( 2018 ).

### Conclusion:-

Based on the result of experiment it was aimed to identify suitable treatment for Maize with respect to yield of Maize during spring season 2021 . it may be concluded that the treatment irrigation with river water with  $750 \text{ mg.L}^{-1}$  of ascorbic spraying was recorded the best among treatments combinations on ( corn cob length 21,677 cm and corn cob diameter 4.267 cm and the total number of grains in corn cob 676.7 grains).

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