Effect of alternating salinity and discharge of emitters on some soil properties and the growth of maize plant (*Zea mays L.*)

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Abstract

This study was conducted in Al-Nasr District / Dhi Qar Governorate during the spring season 2022 on Silt Clay Loam soil to study the alternation of irrigation water salinity in two double pipes for each experimental unit and the drainage of drips under the drip irrigation system in the study of some physical properties of soil and corn plant growth yellow (Zea mays L.) and two types of irrigation water were used, namely, high salinity water (WH) with salinity ranging between 5.70 - 6.20 dS.m^{-1}. And low salinity water (WL) with salinity ranging between 1.80-2.10 dS.m^{-1}, organized in four dual shifts in a spatial and temporal succession according to the quality of the irrigation water, that is, in each experimental unit two adjacent field tubes, as the dots fixed on the first field tube are given 25 % of the evaporation value is high salinity water. As for the second pipe adjacent to it, it gives 75% of the low salinity water of the evaporation value. This is done in the first irrigation. In the second irrigation, the irrigation system is reversed, meaning that the first pipe discharges water 75% of low salinity water, and the second pipe is 25 % of high salinity water from the value of evaporation. In the third irrigation, the method of the first irrigation is applied, and in the fourth irrigation, the method of the second irrigation is applied, and so on. For the first saline shift (WL75% + WH25%) and it is applied to the other salt shifts as explained previously (WH50% + WL50%), (WH75% + WL25%) and (WL50% + WL50%), and three forms were used: (4) , 10, 16) liters per hour^{-1}. An irrigation level of 100% EP was used and irrigation is done when the soil loses 25% of its moisture content at field capacity. A randomized complete block design (R.C.B.D) with three replications was used. The results of the study showed that soil construction improves by using low salinity water and medium drainage, as well as rotation (WL75% + WH25%), which gave positive results in soil construction and plant growth with a rationalization rate of 25% in low salinity irrigation water. While the high salinity shift intertwined with the discharge 16 liters hour^{-1} recorded the highest values in the moisture content amounting to 0.324, the low salinity shift gave 0.285 intertwined with the discharge 16 liters hour^{-1}.

The results showed an increase in plant height and the total number of roots in the low saline shift overlapping with the high drainage 16 liters hour^{-1}, which gave 198.50 cm and 348.00 plant roots^{-1}, compared with the high salinity shift overlapping with the low drainage 4 liters hour^{-1}, which recorded 148.23 cm and 234.00 plant root^{-1}, respectively.

1. Introduction

The expansion of agriculture vertically and horizontally to secure the necessary food is linked to the availability of additional quantities of irrigation water for agriculture, but the limited sources of freshwater (FAO, 1990, Alsharifi et al.,2021) requires the search for alternative water sources to be exploited in agriculture, so many studies and current research in countries The world, including Iraq, has decided to use low-quality water, such as sewage water, saline groundwater, and sewage water, after making some improvements to it. This situation has spread widely in Iraq after the drop in the water level

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in the Tigris and Euphrates rivers, which requires serious thinking about the use of water of different qualities. However, the use of this water was accompanied by an increase in the amount of precipitated (accumulated) salts in the soil sector, which resulted in an imbalance in the water-saline balance of the soil, as the salts gradually accumulate and accumulate and the soil turns from its natural state to soils affected by salinity, in addition to the deterioration that occurs in the physical properties of As a result of using this water, especially when using tourist irrigation methods (Al-Halfi, 2016; Alsharifi and Ameen,2018).

Therefore, it is necessary to find ways and means that reduce the negative effects of this water, including the use of modern irrigation techniques, the most important of which is surface drip irrigation and sub-surface irrigation, as it is one of the most suitable methods for its use in dry and semi-arid areas due to its efficient use. However, the use of the method alone leads to the accumulation of salts at the limits of the wetting front significantly, and this in turn requires supportive irrigation methods to remove these salts, such as the methods of tourist irrigation, and this is what Allawi and others (2018) found that alternating Drip irrigation and then drip irrigation within an irrigation cycle led to a reduction in soil salinity for the treatments in which rotation was used compared with the use of drip and drip irrigation each separately, and that this method proved highly efficient in reducing the percentage of salt in the soil and increasing the vegetative growth of the plant.

The method of periodic irrigation of low-quality and good-quality water will prevent the accumulation of salts in the soil while allowing it to compensate for about half of the water needs of the crop. Saltwater and its use in irrigation will reduce the volume of good-quality water that is normally used for salt-sensitive crops. The use of saline water followed by irrigation with fresh water is the method that is preferred over the periodic method. It may also be referred to as the method of mixing water, which was included by several researchers, as the rotation system does not require mixing requirements for water, in addition to the high efficiency in transferring and adding water to the soil and what produces It improves or maintains the physical properties of the soil (Fahad et al., 2006; Shtewy et al.,2020).

2. Materials and methods

A field experiment was carried out in Al-Nasr District, Dhi Qar Governorate, located between latitudes 07^{-} 29^{0} and 31^{0} 18^{-} north and arc lengths of 35^{-} 46^{0} and 31^{-} 48^{0} east. Physiologically, it is located within the shoulders of the branch rivers of Shatt al-Gharraf. The soil surface was amended and leveled, the experiment site has an area of 1625m^2, and the soil was plowed perpendicular to the smoothing and leveling of the soil surface using the two modifiers. The soil trough was excavated with dimensions (1 x 2 x 1) m to take soil samples with a depth of (0-30) cm, air dried, and passed through a 2 mm sieve to estimate some physical and chemical properties as shown in Table (1).

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Table (1) some initial physical properties of the soil before planting and some chemical properties of the irrigation water used.

Quantity	Properties	
155.00	$g.kg^{-1}$ soil	Sand
481.00		Silt
364.00		Clay
silt clay loam		texture
0.41	MWD mm	
1.391	(ρ_b) Mg m^{-3}	
7.78	pH	
3.55	EC_e dS m^{-1}	
2.65	True Density Mg m^{-3}	
47.50	*P %*	

high salinity	low salinity		
5.70 - 6.20 dS.m^{-1}	1.80 – 2.10 dS.m^{-1}	EC	Irrigation Water
7.00 – 7.30	7.20 - 7.30	pH	

The drip irrigation system was installed at the experimental site using a pump with a discharge (15 m^3 per $hour^{-1}$) connected to two intake tubes, each tube connected to a water tank different from the other at the level of salinity and controlling the irrigation water withdrawal mechanism with special and manual pressure regulators, and the pressures were controlled inside Irrigation network by locking backwater. The distance between the dots installed on the double field tubes was 25 cm, distributed differently on the two adjacent field tubes (double and contiguous field tubes), meaning that the distance between the dots on one tube was 50 cm, while the Turbo key drippers with a toothed cover were used.

The experiment included the use of the site rotation method and the irrigation time (chronological rotation), as a double drip irrigation system was used for two field tubes (fixed), whereby the pump is allowed to push the irrigation water of low salinity to drain and the specified time to the irrigation network in the field and then the other pump intake pipe is diverted Through the pressure regulator towards the high salinity water tank, as well as with the drain and the predetermined time as well. The system of arranging shifts, and as an

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example for one of the experimental units, was as follows:-

1- Treatment (WL75% + WH25% of the evaporation value). It is applied in an experimental unit that uses two field tubes, as the dots fixed on the first field tube give 25% of the evaporation value of high salinity water, while the second tube adjacent to it gives 75% of the low salinity water of the evaporation value and this is done in the first irrigation, while in the second irrigation the irrigation system is reversed That is, the first pipe discharges 75% of the water from low salinity water, and the second pipe is 25% of high salinity water from the value of evaporation.

The amount of water needed for irrigation was calculated based on the evaporation value directly from the American evaporation basin (Evap. pan class-A). While the depth of the irrigation water and the added operating time were calculated by delivering the soil moisture to the limits of the field capacity in the first irrigation according to the equation given by Kovda et al., (1973):-

$$V = A \times (pw_2 - pw_1) \times pb \times d \dots\dots\dots (1)$$

Since:-

V: the volume of irrigation water to bring the soil to the limits of the field capacity (m^3).

A: The area of the experimental unit (m^2). Pw1: the weighted moisture before the subsequent irrigation. pw2: weighted humidity at field capacity.

ρb: the bulk density of the soil (micrograms m^{-1}). d: depth of the root zone (cm).

The experiment was designed using a Randomized Completely Block Design (R.C.B.D) with three replications, where the 12 experimental transactions were randomly distributed over the experimental units in each sector so that the total number of experimental units was 36 experimental units.

The study included the following factorial transactions:

1- Irrigation shift worker according to water quality:

A- Low salinity water with electrical conductivity ranging from 1.80 to 2.10 $dS.m^{-1}$.

b- High salinity water, whose electrical conductivity ranges between 5.70 - 6.20 $dS.m^{-1}$.

code	**Type of transaction**
WL75%+WH25%	**Drip irrigation, low salinity water 75% + high salinity water 25% (of the evaporation value).**
WH75%+WL25%	**Drip irrigation, high salinity water 75% + low salinity water 25% (of the evaporation value).**
WH50%+WL50%	**Drip irrigation, high salinity water 50% + low salinity water 50% (of the evaporation value).**
WL50%+WL50%	**Drip irrigation, low salinity water 50% + low salinity water 50% (of the evaporation value).**

2 - Emitters discharge factor. Three charges were used.

A - 4 liters per $hour^{-1}$. B - 10 liters per $hour^{-1}$. C - 16 liters per $hour^{-1}$.

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3. Results and discussion

The results of the statistical analysis of the F-test (Table 2) indicate that there is a significant effect of the two factors of salinity alternation and the discharge of dots, and their overlap in the values of the weighted diameter rate. It is evident from Table (3) that there is a significant superiority in the values of (MWD) for treatment WL50% + WL50%, as it gave 0.359 mm, while the lowest values were recorded with a general average of 0.342, 0.319 and 0.284 mm for shifts WL75% + WH25% and WH50% + WL50% and WH75%+WL25% respectively. The reason for the decrease in MWD values may be due to the increase in the salinity of irrigation water during the shift, which led to an increase in soil salinity and thus to the deterioration and demolition of soil structures and the dissolution of their aggregates, in addition to an increase in the concentration of sodium ions, (Malash, et al., 2008).

As for the change in MWD values with the drippers' expenditures, the results in Table (3) show that there is a significant superiority for the discharge of 10 (liters hour^{-1}) and it gave the highest values compared to the expenditures 4 and 16 (liters hour^{-1}), as the values as a general average for all treatments were 0.374, 0.330, 0.274 mm for the mentioned expenses, respectively. The superiority of drainage (10 liters per hour^{-1}) may be because the speed of wetting resulting from the amount of added water was balanced in a way that did not harm the structure of the soil relatively due to the negative effect of rapid wetting on the soil aggregates, keeping the soil moist, maintaining appropriate moisture content, and the absence of cracking in periods Drought between irrigations that destroy soil pools. As well as its efficiency in washing away the salts at the limits of the hydration front compared to the low moisture level provided by drain 4 (liter per hour^{-1}) with a slow wetting speed and the high moisture content provided by the drain 16 (liter per hour^{-1}) with a high wetting speed that leads to structural deterioration Soil (Al-Shami, 2013).

The results of Table (3) indicate that there is a significant effect of the interaction between the alternation of salinity and discharge on the average weighted diameter. It is clear that the highest significant differences were between the salinity shift WL50% + WL50% compared to the shifts WL75% + WH25%, WH50% + WL50% and WH75% + WL25% for all the droplet expenses. The reason for the decrease in the values of (MWD) for shifts in succession is attributed to the effect of the high percentage of irrigation water salinity and its role in the deterioration of the soil structure and thus weakening the bonding strength between the particles within the same group, leading to the predominance of the false building, which is quickly subjected to deterioration during the humidification process, and this is what he indicated (Al-Janabi, 2006).

Table (2) Analysis of variance of tabular F values for the studied traits.

source	df	Weighted diameter rate (mm)	Bulk density (mg. m^3)	moisture content	plant height (cm)	Percentage of scattered roots
alternating salinity	**3**	**697.75****	**737.83****	**878.23****	**2589.62****	**1554.08****
discharge of emitters	**2**	**2208.04****	**1783.33****	**430.49****	**477.33****	**323.52****
A.S*Q	**6**	**23.08****	**17.91****	**18.41****	**3.58***	**5.71****
	A.S:- alternating salinity Q:- discharge of emitters					

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Table (3) The effect of the interaction between salinity alternation and dripping discharge on the values of the weighted diameter ratio (mm).

	Weighted diameter rating (mm)			
Average salinity rotation	**Emitters discharge (liter per hour^{-1})**			**salinity rotation**
	16	**10**	**4**	
0.342	**0.289**	**0.391**	**0.346**	**WL75%+WH25 %**
0.284	**0.240**	**0.315**	**0.298**	**WH75%+WL25 %**
0.319	**0.265**	**0.374**	**0.319**	**WH50%+WL50 %**
0.359	**0.304**	**0.416**	**0.357**	**WL50%+WL50 %**
---	**0.274**	**0.374**	**0.330**	**drip average discharge**
Values LSD: salinity rotation: 0.003567*، Emitters discharge: 0.003089* ، Q x A.S: 0.006179* * ((P≤0.05.				

It is clear from the results of the statistical analysis of the F-test (Table 2) that there is a significant effect of the two factors of salinity alternation and the discharge of drips and their interaction in the values of the bulk density. It is clear from Table (4) that there is a significant superiority in the values of (P_b) for the treatment WL50% + WL50%, as it recorded 1.261 Mg m^{-3}, while the highest values were with a general average of 1.294, 1.312 and 1.334 Mg m^{-3} for shifts WL75% + WH25% and WH50%+WL50% and WH75%+WL25%, respectively. The reason for the high values of the bulk density of these treatments may be attributed to the high percentage of soil salinity in it, as well as the increase in the ratio of adsorbed and exchanged sodium ions on the exchange complex, which works on the deterioration of soil aggregates and the dispersal of its particles, leading to blockage of pore spaces and a decrease in its percentage and an increase in the bulk density of soil (Al-Mousawi (2007).

As for changing the values of (P_b) with the drippers' expenditures, the results in Table (4) show that there is a significant superiority for the discharge of 10 (liters hour^{-1}) and it gave the lowest values compared to the expenditures 4 and 16 (liters hour^{-1}), as the values were as a general average for all treatments 1.263, 1.292, 1.345 Mg m^{-3} for the aforementioned discharges respectively. This increase in (P_b) is attributed to the discharge of 16 (liters hour^{-1}) from a gradual deterioration of the soil structure as a result of air confinement and swelling of soil clays and thus the destruction of aggregates and dispersal of soil particles, and this agrees With what was indicated by (Blanco et al., 2008).

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The results of Table (4) show that there is a significant effect of the interaction between the salinity shift and the discharge in the bulk density. It was evident that the least significant differences were between the salinity shift WL50% + WL50% compared to the shifts WL75% + WH25%, WH50% + WL50% and WH75% + WL25% for all the drippers' expenditures. We conclude from these results that the increase in the rotation of the irrigation water with low salinity and the average discharge of the drippers leads to the displacement of salts away from the space of the root system spreading, which helps to improve the properties of the soil by linking its particles and increasing its porosity, in addition to the presence of microorganisms and the substances they secrete that help in improving the construction of the soil. Soil (Leogrande et al., 2016).

Table (4) Effect of the interaction between salinity alternation and dripping discharge on the apparent density values (Mg m^{-3}).

	(P_b) Mg m^{-3}			
Average salinity rotation	**Emitters discharge (liter per $hour^{-1}$)**			**salinity rotation**
	16	**10**	**4**	
1.294	**1.332**	**1.261**	**1.289**	**WL75%+WH25%**
1.334	**1.390**	**1.294**	**1.317**	**WH75%+WL25%**
1.312	**1.356**	**1.280**	**1.302**	**WH50%+WL50%**
1.261	**1.302**	**1.219**	**1.261**	**WL50%+WL50%**
---	**1.345**	**1.263**	**1.292**	**drip average discharge**
Values LSD: salinity rotation: 0.003319*، Emitters discharge: 0.002875* ، Q x A.S: 0.005749* * ((P≤0.05.				

It is noticed from the results of the statistical analysis of the F-test (Table 2) that there is a highly significant effect of each of the two factors of salinity shifts and drip discharges and their overlap in the values of (Pw). It is evident from Table (5) that there is a significant superiority in the (Pw) values for the treatment WH75% + WL25%, as it gave 0.314, while it gave the lowest values with a general average of 0.302, 0.286 and 0.264 for shifts WH50% + WL50% and WL75% + WH25% and WL50%+WL50% respectively.

The reason for the increase in Pw with an increase in the use of high salinity water is due to the effect of salinity on the deterioration of the physical properties of the soil, such as an increase in the bulk density and a decrease in

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the average weighted diameter, which in turn reduces the water conductivity of the soil and increases its water retention, (Shabib, 2010). The increase in the salinity of the irrigation water leads to the deterioration of the physical properties of the soil and then the increase in the moisture content. In addition to root water absorption, the nature of its spread, and the size of the root system, it is better in treatments irrigated with low salinity water compared to treatments irrigated with high salinity water. Also, the roots of maize plants contribute to increasing the efficiency of salt washing by improving the movement of water in the root zone and Improving the permeability of the soil by increasing the depth of the roots.

As for changing the values of Pw with the drippers' expenditures, the results in Table (5) show that there is a highly significant superiority of the discharge 16 (liters-hour^{-1}) and it gave the highest values compared to the expenditures 10 and 4(liters-hour^{-1}), as the values were as a general average for all transactions. 0.305, 0.291, 0.279 for the mentioned expenses, respectively. The superiority of drainage 16 (liters per hour-1) may be because the increase in drainage leads to an increase in the water conductivity of the soil and thus increases the rate of horizontal movement of water in the soil body, which increases the moisture content in the soil sector, especially at the surface layers, in addition to that, the differences in Pw between Discharges are due to the different movement of water, by increasing the horizontal movement of water by increasing the drainage of drips, especially in soils with fine textures, (Dikinya, 2006). In addition, the content.

It is clear from the results of Table (5) that there is a significant effect of the interaction between the salinity shift and the discharge in the values of Pw. It is evident that the highest significant differences were between salinity shifts (WH75% + WL25% compared to shifts WH50% + WL50%, WL75% + WH25% and WL50% + WL50%) for all droplet expenses. The reason for the high values of Pw for high salinity water treatments may be due to the low level of the plant's ability to benefit from irrigation water at this level of salinity, due to the weak growth of the root system of the plant in conditions of saline stress due to the salinity of the irrigation water, which was reflected on the ability of the plant to absorb water. It is also noted that the treatments in which low salinity water was used are more salt removal from the surface layer to the sub-layers in the soil bed, allowing the root system to grow and benefit from the moisture content in the soil.

The results of the statistical analysis of F-test (Table 2) show that there is a significant effect of each of the two factors of salinity alternation and droplet discharge and their interaction in plant height values. It is noticed from Table (6) that there is a significant superiority in the plant height values for the treatment WL50% + WL50%, as it gave 192.78 cm, while the lowest values were recorded with a general average of 182.87, 169.28 and 154.42 cm for the shifts WL75% + WH25% and WH50% + WL50 % and WH75%+WL25%, respectively.

Table (5) The effect of the interaction between salinity shift and dripping drainage on the distribution of soil moisture content by weight.

	moisture content			
Average salinity rotation	**Emitters discharge (liter per hour^{-1})**			**salinity rotation**
	16	**10**	**4**	
0.286	**0.299**	**0.288**	**0.272**	**WL75%+WH25%**
0.314	**0.324**	**0.313**	**0.305**	**WH75%+WL25%**
0.302	**0.312**	**0.302**	**0.293**	**WH50%+WL50%**
0.264	**0.285**	**0.262**	**0.244**	**WL50%+WL50%**
---	**0.305**	**0.291**	**0.279**	**drip average discharge**
Values LSD: salinity rotation: 0.002133 ، Emitters discharge: 0.001847* ، Q x A.S: 0.003694* *** ((P≤0.05.**				

The decrease in plant height as a result of the use of high salinity water is due to the state of water stress to which the plant is exposed due to the increase in the salinity of the irrigation water, which results in negative effects on the nutritional balance and vital processes inside the plant such as photosynthesis and inhibition of enzymes (Tawajen et al., 2004).

While concerning changing the plant height values with the drippers' expenditures, the results in Table (6) show that there is a highly significant superiority for the discharge 16 (liters hour^{-1}) and it gave the highest values compared to the expenditures 10 and 4 (liters hour^{-1}), as the values were as a general average for all Transactions 181.17, 174.58, 168.77 cm for the mentioned expenses, respectively. The superiority of the discharge (16 liters per hour^{-1}) may be due to the effect of increasing the discharge in improving the physical properties, as it led to an increase in the weighted diameter rate, a decrease in the bulk density, and an increase in salt washing due to an increase in the moisture content, which is reflected in an increase in the height of plants (Khaled et al., 2002).

The results of Table (6) show that there is a significant effect of the interaction between salinity alternation and discharge in the values of Pw. It is clear that the highest significant differences were between the salinity shift WL50% + WL50% compared to the shifts WL75% + WH25%, WH50% + WL50% and WH75% + WL25% for all the droplet expenses. The use of low drainage did not reduce the salinity of the soil to the appropriate values for plant growth, which caused a decrease in the height of the plant as a result of the occurrence of high salt

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accumulation. Due to the high drainage efficiency in removing the effect of the accumulated salts (Abid et al., 2001), the height of plants is severely affected when there is a state of water stress, as the plant creates the largest leaf area in the case of low soil brine, which is important in high The plant and that any defect in the physiological processes of the plant may affect the ability of plant growth and thus increase its height.

Table (6) The effect of the interaction between the alternation of salinity and the drainage of drips on the values of plant height, cm.

	plant height (cm)			
Average salinity rotation	**Emitters discharge (liter per hour^{-1})**			**salinity rotation**
	16	**10**	**4**	
182.87	**188.40**	**182.00**	**178.21**	**WL75%+WH25%**
154.42	**161.53**	**153.50**	**148.23**	**WH75%+WL25%**
169.28	**176.23**	**169.43**	**162.17**	**WH50%+WL50%**
192.78	**198.50**	**193.37**	**186.47**	**WL50%+WL50%**
---	**181.17**	**174.58**	**168.77**	**drip average discharge**
Values LSD: salinity rotation: 0.956 * ، Emitters discharge: 0.828* ، Q x A.S: 1.657* * ((P≤0.05.				

The results of the statistical analysis of the F-test (Table 2) show that there is a significant effect of the two factors of salinity alternation and droplet discharge and their overlap in the values of the number of roots and their distribution. It is noted from Table (7) that there is a significant superiority in the number of roots for the treatment WL50% + WL50%, as it gave 332.00 plant root^{-1}, while the lowest values were recorded with an overall average of 305.33, 279.44 and 249.67 plant root^{-1} for WL75% + WH25% alternates. and WH50%+WL50% and WH75%+WL25% respectively. The increase in the number of roots may be due to the use of alternating salinity with low-salinity irrigation water, which led to an improvement in the physical properties of the soil, such as building the soil, increasing its aggregates, and decreasing its density, and then increasing the spread and density of roots in the soil (Shabib, 2010).

While changing the values of the number of roots and their distribution with the discharge of drippers, the results in Table (7) show that there is a significant superiority for the discharge of 16 (liters hour^{-1}), and the highest values were recorded compared to the expenditures of 10 and 4 (liters hour^{-1}), where the values and as a general average for all transactions 304.09, 294.17, 276.57 plant root^{-1} for the aforementioned expenditures, respectively. This increase was consistent with the increase that occurred in the vegetative total, meaning that the nature of its growth is in response to the growth occurring in the vegetative total, as the growth and spread of roots is a response to the growth occurring in the vegetative part.

It is noted from the results of Table (7) that there is a significant effect of the interaction between the alternation of salinity and the discharge in the values of the number of roots. It was found that the highest significant differences were between the salinity shift WL50% + WL50% compared to the shifts WL75% + WH25%, WH50% + WL50% and WH75% + WL25% and for all drippers expenses. The reason for the decrease in the horizontal spread of roots by a decrease in the rate of discharge and an increase in the percentage of using high salinity water is due to the decrease in moisture content in the same direction and the increase in the accumulation of salts in the space near the dots, and this depends on the percentage of using high salinity water in the irrigation shift, which affects the spread of roots (Emdad.et al., 2006).

Table (7) Effect of the interaction between salinity alternation and dripper drainage on the values of the number of spreading roots.

	The number of roots scattered			
Average salinity rotation	**Emitters discharge (liter per hour^{-1})**			**salinity rotation**
	16	**10**	**4**	
305.33	**315.37**	**307.33**	**293.29**	**WL75%+WH25%**
249.67	**262.00**	**253.00**	**234.00**	**WH75%+WL25%**
279.44	**291.00**	**279.66**	**267.68**	**WH50%+WL50%**
332.00	**348.00**	**336.67**	**311.33**	**WL50%+WL50%**
---	**304.09**	**294.17**	**276.57**	متوسط تصريف المنقطات
Values LSD: salinity rotation: 2.610* ،Emitters discharge: 2.260* ،Q x A.S: 4.520*				
*** ((P≤0.05.**				

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4. Conclusions

In recent years, we notice that there is a clear shortage of irrigation water in Iraq because of what the world suffers from today in general from the problem of global warming and the scourge of desertification, which has clearly and negatively affected the environment and climate of Iraq, as well as the scarcity of the levels of the Tigris and Euphrates rivers from the source. Therefore, solutions must be found in Rationalizing the use of fresh water with low electrical conductivity and making use as much as possible of groundwater and drainage water of high salinity without a significant negative impact on the properties of the soil as well as the growth of the crop. Therefore, the results of this study showed that the alternating fresh and saltwater irrigation system contributed to rationalizing the fresh irrigation water clearly without significant damage to the soil properties and plant growth and to coming up with a new combination between the appropriate dripper expenses and salinity shifts and the preservation of soil structure and plant growth. It was noticed that the average expenditures and alternating salinity WL75% + WH25% gave good results in the characteristics of the studied experiment.

5. References.

Abid , M.; A. Qayyum ; A. A. Dasti and R. Abdul Wajid, (2001). Effect of salinity and SAR of irrigation water on yield, physiological growth parameters of Maize (Zea Mays L.) and properties of the soil. J. Res.

Al-Halfi, Gomaa Abdul-Zahra Nafie (2016). Effect of soil conditioners and rotation on some irrigation treatments on some soil properties and maize yield using drip irrigation system. Master's thesis, College of Agriculture. Albasrah university .

Aliwi, Abdul Redha Jassem, Dakhil Radhi Ndawi and Kawthar Aziz Al Mousawi (2018). Effect of irrigation with low and high salinity water and soil conditioners on moisture distribution and yield of maize crop under the proposed dual drip irrigation system. Dhi Qar University Journal of Agricultural Sciences. folder (7). number 1 . 2018 .

Al-Shami, Yahya Odeh Ajeeb (2013). Effect of adding soil conditioners on some soil properties using drip and drip irrigation methods in clay soil and the growth of maize plant (Zea mays L.) Master Thesis. faculty of Agriculture . Albasrah university .

Al-Janabi, Iman Abdul-Mahdi and Alaa Saleh Atti (2006). Effect of the type and level of organic waste interfering with saline water on some soil properties. B . Calcareous soils. Iraqi Journal of Science.

Al-Moussawi, Kawthar Aziz Hamid (2007). The effect of alternating irrigation water and soil moisture level on the physical properties of the marsh soil and its relationship to water consumption during the growth stages of the sorghum crop. PhD thesis, College of Agriculture, University of Basra.

Alsharifi.S.K, and Ameen. S.H, (2018).Study some performance indicators and soil physical properties for wheat Zagros variety. Euphrates Journal of Agriculture Science, 10(4); 23-35.

Alsharifi.S.K, Alaamer S.A, and Nayyef.H.R,(2021) . Effect of sowing methods, sowing depth and sowing distances on some characteristics of growth and wheat yield. 3rd international conference on food, Agriculture and veterinary, Izmir-TURKEY 2021.p;1278-1288

Blanco, F.F.; M. Y. Folegatti; H. R. Gheyi, and P. D. Fernandes, (2008). Growth and yield of corn irrigated with saline water. Science Agricola 11 degraded soil amended with organic matter. Soil Sci. Soc. Am.

Dikinya, O; C. Hinz and G. Aylmore. 2006. Dispersion and re-deposition of fine particles

ISSN 2072-3875

and their effects on hydraulic conductivity. Australian Journal of Soil Research. 44 (1); 47-56.

Emdad. M. R. , M. Shahabifar; and H. Fardad .2006. Effect of different water qualities on soil pysical properties. Tenth International Water Technology Conference, IWTC10 2006, Alexandria, Egypt.

Fahd, Ali Abd, Kamal Yaqoub Shaba and Ibrahim Lafta Jiyad (2006). Using saline water for successive seasons to irrigate maize and its effects on yield and soil salinity. Iraqi Agriculture Journal, 11 (1): 1-12.

Khaled Badr Hammadi, Nayef Mahmoud Fayyad, Walid Muhammad Mukhlif (2002). Effect of mixing sewage water and fresh water on the yield of wheat and maize and the accumulation of salts in the soil. Iraqi Agriculture Journal, Volume 7, Number 2: 31-36.

Kovda, V. A. (1973). Irrigation Drainage and salinity.FAO/UNESCO.An International Source Book.Hutchison and Co., L td. P. 468,478 .

Leogrande, R.; C. Vitti; O. Lopedota; D. Ventrella and F. Montemurro, (2016). Effects of irrigation volume and saline water on maize yield and soil in southern Italy. Irrig. And Dran.

Malash N . M .; T . J . Flowers ; and R. Ragab ; (2008) . Effect of irrigation methods management and salinity of irrigation water on tomato yield , soil moisture and salinity distribution . Irrig Sci (26) : 313 – 323 .

Shabib, Yahya Jihad (2010). Effect of alternating drip and drip irrigation methods and irrigation water salinity on soil properties and plant growth in clay soils. Master Thesis . faculty of Agriculture . Albasrah university . Iraq .

Shtewy.N, Ibrahim.I.J, and Alsharifi.S.K. (2020). Effect of mechanical properties on some growth characteristics for wheat crop. Plant Archives, 20(1); 3141-3148.

Tawajen, Ahmad Muhammad Musa, Moayad Fadel Abbas and Maysoon Musa Kazem (2004). Response of vegetative growth and flowering indicators in tomato plant Lycopersicon esculentum Mill to salinity of irrigation water and the amino acid proline. Basra Journal of Agricultural Sciences. 15 (1): 122-131.

ISSN 2072-3875