Effect of Distances between Emitters Indrip Irrigation System and Alternation in Irrigation Water Salinity in Some Soil Properties and Growth of Corn Plant "Zea mays L."

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ABSTRACT

This study was conducted in the field of Agriculture College , University of Basrah , in karmat-Ali . during the spring season , 2011. A clay texture soil was used in the study, in order to investigate the effect of emitter distances and alternation between irrigation water treatments by using drip irrigation system on some soil physical and chemical properties , water use efficiency ,vertical and horizontal water movement in soil profile and its effect on growth yield parameters of corn crop(*Zea mays L.*) class search 106 . Four emitters distance was used in the study : 15 ,25 , 35 and 45 cm. Also four irrigation water treatments were used : irrigation water of low salinity (F) EC = 2.0 – 2.3 $ds.m^{-1}$, irrigation water of high salinity(S) EC = 7 -8 $ds.m^{-1}$, di- alternation high salinity water- low salinity water (SF) and trio- alternation high salinity water – high salinity water- low salinity water(SSF) . Factorial experiment was used for combination between distances of emitter and irrigation water treatments which were16 treatments as:

1) Four factorial treatments of distance among emitters 15 ,25 ,35 and 45 cm by using low salinity water.
2) Four factorial treatments of distance among emitters 15.25,35 and 45 cm by using high salinity water.
3) Four factorial treatments of distance among emitters 15,25,35 and 45 cm by using second alternation.
4) Four factorial treatments of distance among emitters 15,25,35 and 45cm by using third alternation.

The irrigation level in this study was 100% from evaporation of pan-A with addition 20% as leaching requirements . Randomized complete block design (R.C.B.D)was used in this experiment with three replications . This study shows:

1- The value of mean weigh diameter , soil infiltration rate and accumulated infiltration have been significant reduction .On other hand, there was significant increase in bulk density , with increase distance between emitters and increase rate of salinity of water in the irrigation cycle(values ، MWD 0.29, 0.15 mm ، i 27.10, 9.40 cm ، P_b 1.26 , 1.42 Mg m^{-3} for d_1F , d_4S respectively) . The interactions between emitters distance and irrigation water treatments, the mean weight diameter was high in the treatments which have far emitters distance with low salinity of water, Also the bulk density reduced compared with treatments which have distances between emitters of closer with high salinity water.

2-High value of soil moisture content were found under the emitters directly. Soil moisture content was reduced horizontally far from the emitters for all of the depths and all of the treatment (0.15 , 0.17,0.18 for 0 , 15 ,30 cm respectively) . On other hand ,the soil moisture content reduced significantly with increased distance of emitters(0.15, 0.16 , 0.18 , 0.19 for 15 ,25 , 35 , 45 cm respectively) .While it was increased significantly with increased of high water salinity in one

the irrigation cycle(0.15 , 0.16 , 0.17 , 019 for F , SF , SSF , S respectively) . the highest values of soil moisture content were with depth 15-30 cm which significant increase on the depths 0-15 , 30-45 cm which didn't significant difference.

3- Soil salt concentration were increased with increasing distances of emitter and with increasing of high water salinity in one of the irrigation cycle (6.23 , 12.79 dS m^{-1} for d_1F , d_4S respectively) , the lowest value of salt was found under the emitters directly and increased with increased emitters distance for all of the depths (8.10 , 9.56 , 11.57 dS m^{-1} for 0 , 15 , 30 cm respectively). For all horizontal distances, lower salt concentration were found in depth 15-30 cm ,and the higher of salt constriction were in depth 30 – 45 cm(9.31, 9.02 10.62 dS m^{-1} for 0-15 , 15 -30 , 30-45 cm respectively) . Interactions between emitters distance and irrigation water treatments , the study shows that , the salt concentration was low in the treatments treatments which have far emitters distance with low water salinity compared with treatments which have closer distances of emitters with high water salinity.

4- The results shows, reduced significantly in corn growth parameters (leaf area , leaf area index , dry matter weight and grains weight ، values for parameters was 1121.25 , 594.00 cm^{-2} ، 1.60 , 0.85 ، 15.85 , 5.29 tan h^{-2} ، 6.85 , 2.57 tan h^{-1} for d_1F , d_4S respectively) with increased distance of emitters and increase using high water salinity. The interaction between distance of emitters and irrigation water treatments the study shows, the growth parameters wrer high in treatments which have far distance of emitters with low water salinity compared with treatments which have closer distances of emitters with high water salinity .

5- According of this study, the total numbers of roots were reduced with increased distance of emitters and with increased of high water salinity. 82.95% of roots system distributed in the depth 0 – 15 cm, where as 92.35% of root system were distributed in the central distance of furrow center 0 ± 15 cm .

6- The results explain, Water use efficiency was reduced with increased distance of emitters and increased of high water salinity. The interactions between distance of emitters and irrigation water treatments the study shows , water use efficiency was higher in the treatments which have far distance of emitters with low water salinity compared with treatments which have closer distance of emitters with high water salinity.

7- Finaly, The distance wetting front movement (horizontaly and vertically) were decreased with increased distance of emitters and increased high water salinity. Philips equations,(1955 ,1957) were used in description of water movement (horizontal and vertical) from source of emitter source .