# EFFECT OF SALINITY LEVELS ON SOIL PRODUCTIVITY AND ITS DESERTIFICATION DEGREE

## summary

Field and pot experiments were conducted at the water Refinery station , college of Engineering , University of Basrah ground , during the season of 2007 aiming to investigate the relationships between soil salinity level and desertification degree , according to the effects of soil salinity on growth of three selected crop ( *sorghum biocolor* , *Zea mays L.* and *Helian thusannumi* ) . Soil salinity levels were prepared by leaching the original saline soil with tap water for different periods , of time until reaching the required salinity levels ( 3.6 , 8.2 , 12.3 , 16.1 , 20.2 and 23.8 $dSm^{-1}$ ) . Complete randomized block and complete randomized designs were followed for the field and the pot experiments , respectively in three replications . The field soil was plowed and fertilized with organic manure and N , P , K fertilizers after being sampled for chemical and physical analysis. The crop seeds were planted in lines for the field experiment , whereas , twenty seeds were planted in each pot.

Tap water was used for irrigation which has been applied up to the field capacity level in addition to 19 % water added as leaching requirements. Seedling emergence % , coefficient of velocity ( C . v % ) and loss % were recorded. The plants were allowed to grow for 85 days after that they were cut. Shoot and root dry weights were recorded and the dry plant materials were subjected to some chemical analysis to determine their content of N , P , K and Na . In addition , soil salinity levels was determined before and after planting. Furthermore soil desertification degree was recorded on the base of the percentage of shoot

dry matter production for each saline treatment compared to that of the control ( none saline ). The obtained results revealed that :

1. Leaching the soil for different periods of time create major difference in some soil chemical ( EC , pH , N , P , K and Na content ) and physical ( bulk density and mean weight diameter ) properties.

2. Increasing the level of soil salinity gave generally a significant reduction in the three crops seedling emergence % and the C . V % for the field and the pot experiments. However the reduction percentages were higher with the field experiment reaching ( 94.50 , 95.58 and 96.66 % ) for *Zea mays* , *Sorgham biocolor* and *Helian thusannumi* crops , respectively. Whereas , a significant increases in loss % for the three crops were associated with the increased soil salinity levels.

3. Increasing soil salinity from 3.6 to 23.8 $dSm^{-1}$ resulted in significant decreases in the production of the three studied crops.

4. Total N , P and K concentration in the shoots and root tissues were significantly decreased due to the increases soil salinity levels , while , a significant increases occurred in the total Na concentration , for the three tested crops and for both experiments. .

5. Depending on the mean of dry matter production of vegetation part and the use of classification of desertification , the treatment $S_1$ has been fallen into a mild , $S_2$ and $S_3$ into a medium , $S_4$ into heavy and $S_5$ , $S_6$ into very heavy desertification classes.