

RECLIMATION OF SALT AFFECTED SOIL BY PHYTOREMIATION IN IRAQ

A Thesis Submitted

By

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In Partial Fulfillment of the Requirements For the Degree of
Master In Agriculture Science
(Soil and Water Sciences Resource) to the Council of Agriculture
At the University of Baghdad

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2011 A.D. 1432 H.

Abstract

The study aim to define the of role of phytoremediation concept in salt removal from the soil through planting two salt-tolerant crops namely *sorghum bicolor* and millet *panicum miliceum* L. in mono and diculture. It also aim to find out the effect of this practice on ion movement in the soil profile and its feasibility as an alternative to the traditional reclamation.

A field experiment was carried at the college of agriculture, University of Baghdad in a silt clay loamy soil classified as Typic Torrifuvent in accordance to a Randomized Complete Block Design with three treatment : S1 monoculture (Sorghum), (Millet) and S3 diculture (Sorghum+Millet), with four replicates.

Soil samples were taken before planting at four depths intervals :(0-25),(25-50),(50-75) and (75-100) cm. Both crops were planted on 21-7-2009. First cutting for all treatments and soil samples at same depths were taken on 8-9-2009. The Mono and Diculture of millet plant were harvested; and soil samples for four depths were taken on 18-10-2009. Sorghum plant were harvested on 9-12-2009, and soil samples of mono and diculture of sorghum were taken at the same date.

Results of the study revealed the followings:

- 1- Treatment S3 was superior in reducing means values of EC as compared with S1 and S2 for four depth and they were 8.5, 7.1, 6.1 and 5.3 dS.m⁻¹ respectively, while they became 4.2,4.7,5.0 and 5.3dS.m⁻¹ after the first cutting, whereas they decreased at 2.8,3.0,4.1 and 4.1dS.m⁻¹ respectively on the second cutting. The highest R² for salt movement before planting was 0.9967 S3 in logarithm equation, the highest R² was at the first and second cutting S2 in a second order polynomial equation at 0.9862 and 0.9987 respectively.

- 2- Treatments S1 and S2 were significantly superior in increased at the first cutting removing 3265 and 3420 kg.h⁻¹ respectively, as compared with S2 and the increase were 89.1 and 98.1% respectively, while S3 treatment was significantly superior in an increase at second cutting at 13072kg.h⁻¹ as compared to S1 and S2 treatments. The increases were 13.2% and 403.3% respectively, S1 treatment was significantly superior as compared to S2 at 283.5%.
- 3- Treatment S3 was superior in the highest value of harvest index 56.0% with significant increase as compared to S1, S2, in an increase of 8.7 and 245.6% respectively, S1 treatment was significantly superior as compared to S2, in a 217.9% ratio.
- 4- Treatment S1 was superior by removal biggest quantity of chloride ion 137.7 kg.h⁻¹. Treatment S2 and S3 were superior by removal biggest quantity of potassium ion 60.8 and 148.5kg.h⁻¹ respectively.
- 5- Treatment S3 was significantly superior, in salt removal, where it was 504.1%kg.h⁻¹ as compared with S1 and S2 in 19.3 and 187.2% ratios respectively, while treatment S1 significantly increased at 424.4 kg.h⁻¹ as compared with S2 treatment in a 140.5% ratio.