



شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكرو فيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
على هذه الأفلام قد أعدت دون أية تغييرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من 15-25 مئوية ورطوبة نسبية من 20-40%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%



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التوثيق الالكتروني والميكروفيلم



EFFECT OF MULCHING ON THE DISTRIBUTION
OF TEMPERATURE, SOIL WATER AND
SALT CONTENT IN SOIL MATERIAL

By

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THESIS

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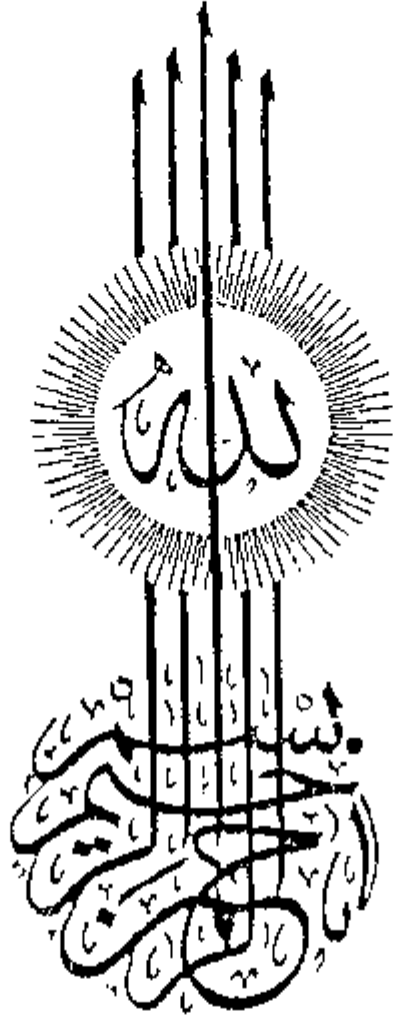
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عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

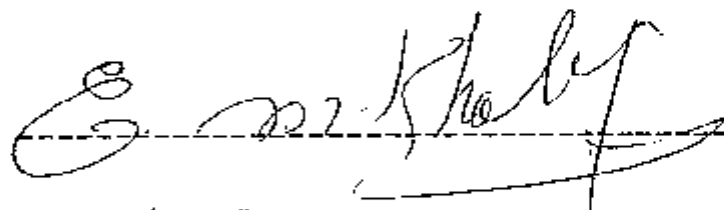
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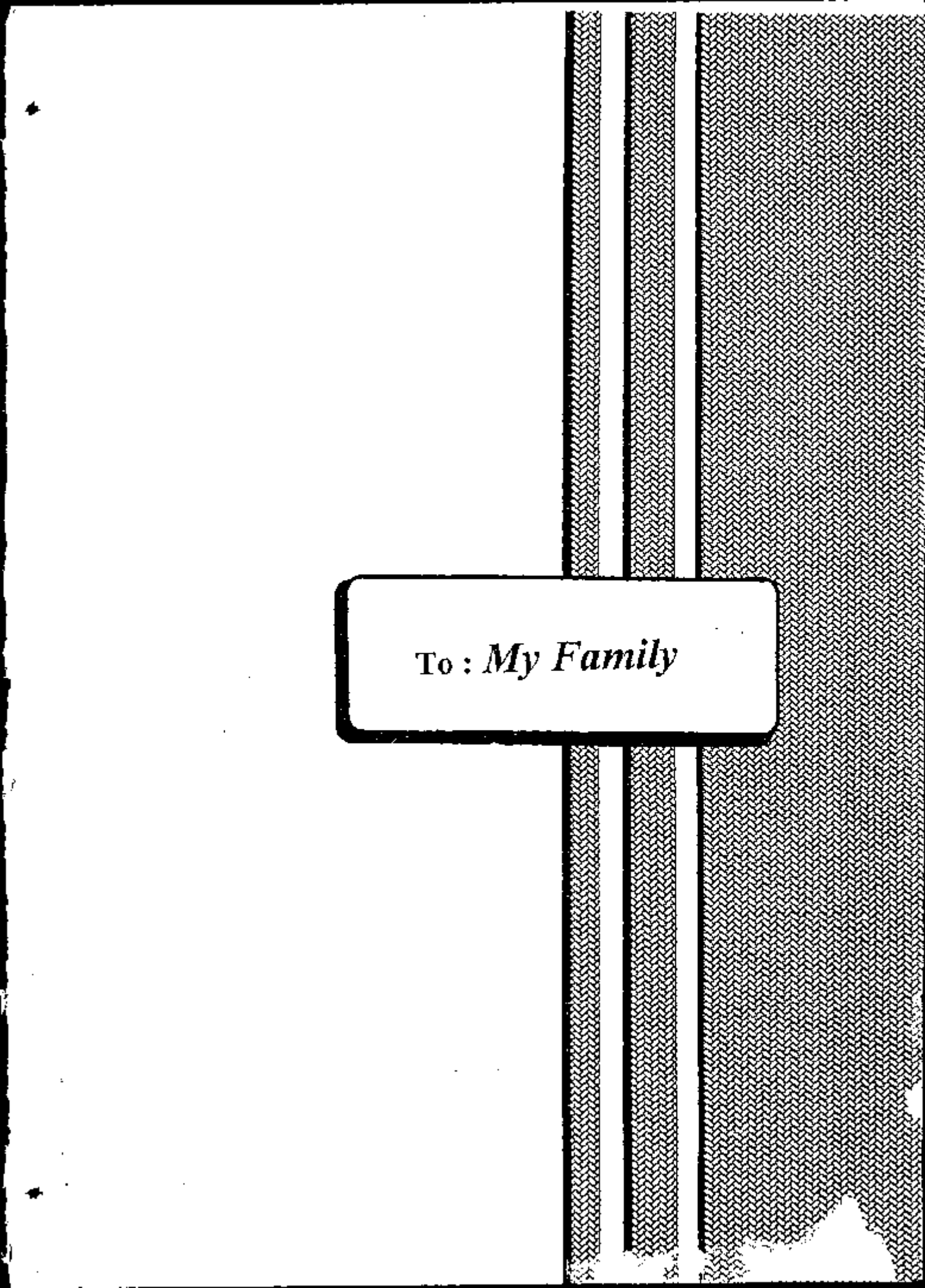
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Date: / /1994

The background of the page is divided into three vertical sections. The leftmost section is white. The middle section is a narrow vertical stripe with a hatched pattern. The rightmost section is a wider vertical stripe with a hatched pattern. A white rectangular box with rounded corners and a black border is centered horizontally across the middle and right sections.

To : *My Family*



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INTRODUCTION

INTRODUCTION

A mulch material can be applied as a cover to soil surface for changing the soil environment. The mulch influences the soil environment by controlling the soil's radiation balance, water evaporation rate, nutrient status, water content, temperature and salt distribution. Most of the various mulch materials are effective in evaporation, erosion, weed, soil structure and infiltration control, and reclamation of saline soils. Direct evaporation from soil is responsible for losses not only from completely bare soil but also from soil incompletely covered by leaves of a crop growing on it. During the whole growing period of an annual crop, as much as half of the water evaporated to the atmosphere may be directly from the soil (Harrold et al., 1959). Barrier-type mulches (plastic sheeting, asphalt covers) are much more effective than natural organic ones and will greatly reduce evaporative water loss for long time periods. Any shading cover (plant residues, seed hulls; gravel, rocks, and wood chips) will reduce evaporative water losses for several days, and if these days are during the sprouting and new growth periods, the moisture saved by mulching can be critical to the survival of the plants (Donahue et al. 1983). Studies by Harrold (1947) and those cited by Schwab et al. (1981) showed that contour cultivation together with good sod waterways reduced watershed runoff 75 to 80 percent at the beginning of season. Reclamation of saline soils, particularly when only rainfall or limited irrigation is used, can be hastened by application

of a surface organic mulch, as reported from the Rio Grands Valley of Texas. Cotton gin trash and chopped woody plants are equally effective when applied at the rate of 67.2 metric ton per hectare. With mulch, the surface soil salt content becomes less whether the area receives only natural rainfall or supplemental sprinkler irrigation (Donahue et al. 1983).

Several researchers have studied the distributions of soil water content and temperature under different mulching conditions. Some of these researchers presented calculated water and temperature values (Chung and Horton, 1987) and others presented observed and calculated temperature values (Mahrer and Katan, 1981). Few studies have been presented for soil water evaporation, and water content; temperature; and solute distributions under different mulching materials.

The objective of this work is covered by two studies. The first is to use a theory of heat and water transfer to predict water content and temperature distributions in soils, and the second is to use a theory of heat, water, and solute transfer to predict water content, temperature, solute concentration in soils. The predicted values using both theories will be compared with observed values. The latter values will be collected using clay soil columns under different mulching materials. Soil columns are used to help in measuring the soil evaporation rate. The suggested mulching materials are bare soil (check), sand, gravel, straw, and evergreen (a substance to increase soil aggregation).

The study is presented in two experiments. The first deal with "Mulching effect on simultaneous water and heat transfer in soil". The second includes was " Mulching effect on simultaneous heat, water, and solute transfer in soil". Results of each experiment were discussed separately and both were presented on the final summary..