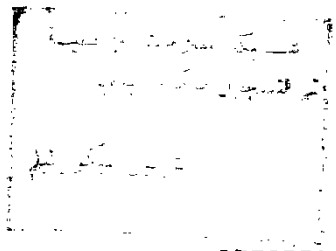
EFFECT OF SOIL MOISTURE STRESS AND NITROGEN FERTILIZATION ON ONION PLANT



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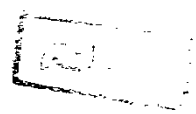

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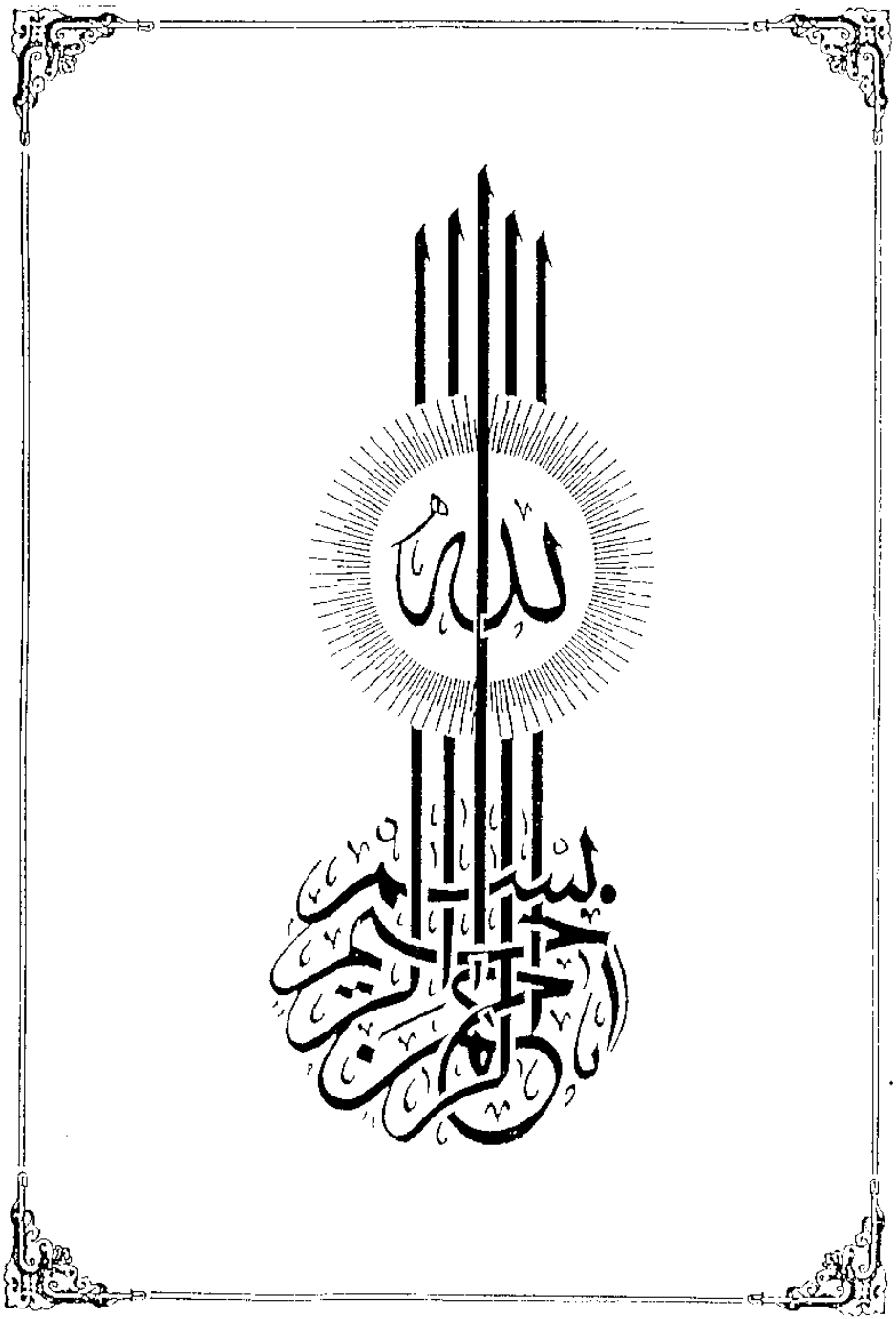

EFFECT OF SOIL MOISTURE STRESS AND NITROGEN FERTILIZATION ON ONION PLANT

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ABSTRACT

Four experiments were carried out in pots and field at Inshas, Atomic Energy Establishment. Firstly, pot experiments : A- Effect of mixing sandy soil with local tafla as a soil conditioner on onion, which was conducted to find out the best growing ratio for next experiments in 1987/1988 and 1988/1989. B- Effect of soil moisture stress and nitrogen fertilization using a mixture of tafla and sandy soil (1:7) in 1988/1989 and 1989/1990 Secondly, field experiment : Effect of soil moisture stress and nitrogen fertilization using sandy soil in 1987/1988 and 1988/1989 Thirdly : Effect of soil moisture stress, nitrogen fertilization and irradiation on storage of onion bulb in 1987/1988.

The results could be summarized as follows :

1- The optimum mixing ratio was 1:7 (tafla : sand) because it was the best ratio for plant growth and highest pungency. No statistically significant differences in yield were found due to the

investigated tafla : sand ratios. This ratio is most economic than the other highest ratios.

2- With using mixture of tafla : sand (1:7), the highest moisture level increased bulb fresf and dry weights and total yield. Besides, no effect of moisture levels on bulbing ratio or shape bulb index. In addition water use efficiency was decreased by application of high or medium moisture level compared to the low level. High level of N application increased bulb fresh and dry weights but reduced total yield and W.U.E. N levels had no effect on bulbing ratio or shape bulb index.

3- In field experiment high irrigation water level was superior for producing highest bulb fresh and dry weights, total and marketable yields, yield index and improvement in bulb shape. Besides, it reduced the bulbing ratio. In addition, the water use efficiency was increased by the application of medium or high soil moisture levels. The addition of the high nitrogen level, reduced the total and marketable yield, yield index and the water use efficiency.

4- Application of low irrigation level, high N levels and 8 K rad was the most favourable treatment for minimizing the loss weight during the storage of onion bulbs. The irradiation with gamma rays completly prevented the sprouting of onion bulbs, under the condition of all soil moisture and / or N levels treatments. The highest decayed were occurred with 6 or 8 k rad, low moisture and medium N levels, after 6 months of storage perioed.

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1. INTRODUCTION

Onion is one of the ancient and important crops in the Egyptian agriculture. In 1990, the planted area was 177,254 feddans and yielded about 1,081,121 tons.

The government is devoting much effort to increase productivity for unit area for most of the field crops grown in Egypt. Onion production has suffered serious problems that are most due to excess irrigation along with heavy nitrogen fertilization, besides the infection with white and neck rot diseases. On the other hand, reductions in onion export which is likely due to inferior bulb characteristics and low keeping quality have been observed.

In addition, land reclamation of sandy soil is a national target in order to realize our horizontal expansion. Using tafla as natural soil conditioner may enhance or improve the hydrophysical and chemical

properties of the treated soil, hence it may affect yield as well as bulb quality.

The present investigation aims, therefore, to study the effect of different levels of irrigation and nitrogen application, in both sandy and tafla sandy soils, on yield and quality of onion bulbs. Besides, the bulbs produced from some investigated treatments were irridiated with gamma rays to study its influence on sprouting and keeping quality of onion bulbs.