[redacted]DIES ON BIOFERTILIZATION IN DESERT SOILS

By

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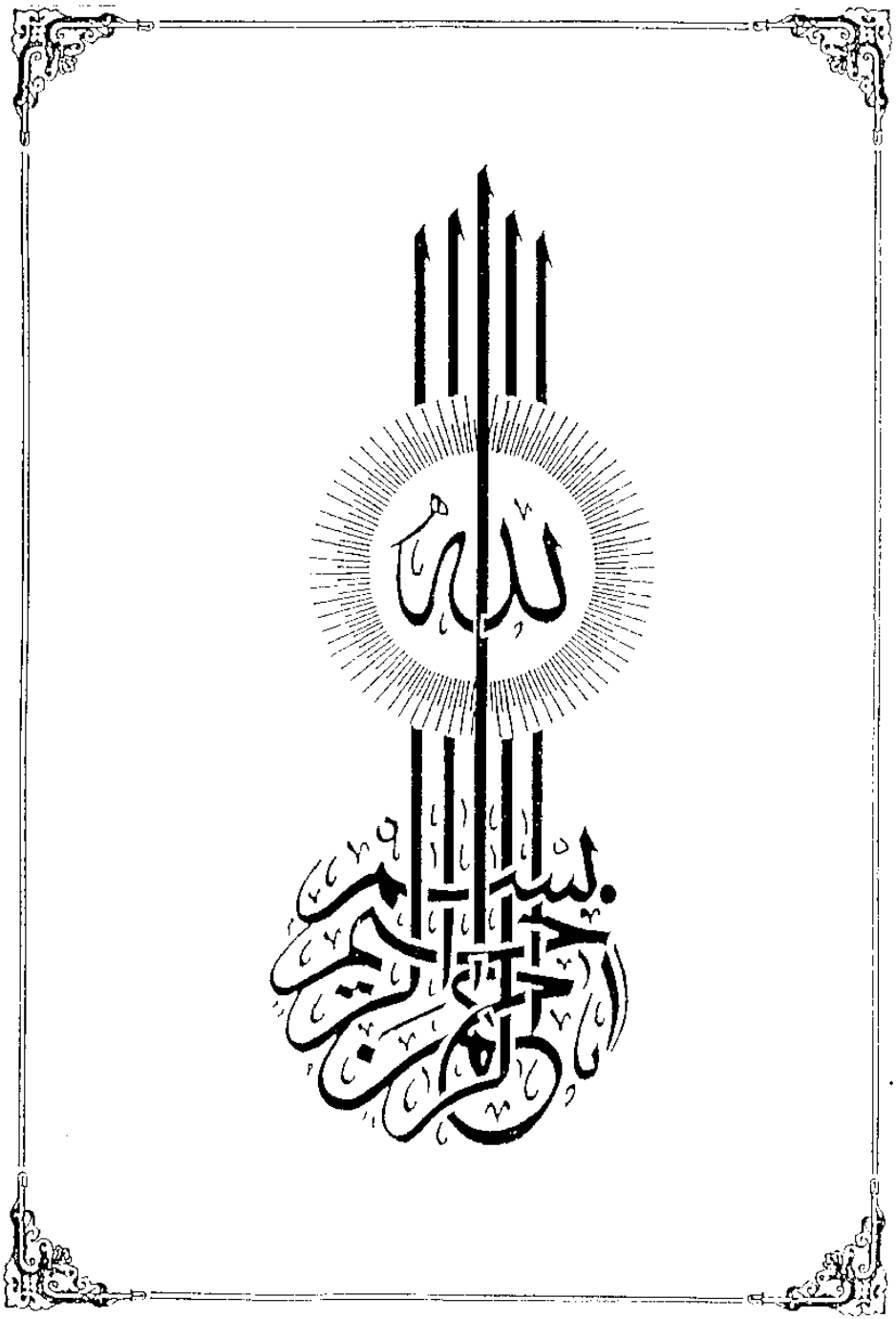

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ABSTRACT

Two field experiments were carried out in two successive seasons (1989-1990 & 1990 - 1991) to investigate the effects of biofertilization using associative N_2-fixers *(Azotobacter chroococcum* and *Azospirillum lipoferum)* and/or symbiotic ones *(Bradyrhizobium japonicum)* on the growth and yield of salt tolerant variety of wheat plants. Cultivation was carried out in desert loamy sandy soil (Ras-Sidr, South Sinai). The growing plants were irrigated with a salty water of 7000 ppm of total soluble salts

and supplemented with full or half the normal field dose of inorganic N-fertilizer. Organic manure (garbage compost) was applied at the rate of 0.5% one month before the beginning of experiments. Plant and rhizospheric soil samples were periodically collected during 120 days after wheat cultivation to determine soil total nitrogen, organic carbon content, CO_2 evolution, total microbial count, densities of fungi, actinomycetes, azotobacters, and azospirilla. At harvest time, straw and grain yields were determined as well as total nitrogen content of straw and grains.

The obtained results showed that inoculation with a multistrains inoculant *(Azotobacter, Azospirillum and Bradyrhizobium)* gave the highest growth and yield of wheat plants in the presence of the full dose of inorganic N-fertilizer.

Key Words:

Azotobacter chroococcum, Azospirillum lipoferum, Bradyrhizobium japonicum, biofertilizer, rhizosphere, fungi, actinomycetes, garbage compost.

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1- INTRODUCTION

It is well known that cultivation of cereals in sandy soils is of a great importance especially in developing countries like Egypt, where desert lands are prevailing (about 94% of the whole area) and nutrition is mainly based on cereals.

Much interest is focussed on dinitrogen fixing systems to improve plant growth and consequently straw and grain yields of many of graminious plants. However, for a long time, stress has been given to such systems as important means for providing nitrogen to the growing plants and for overcoming the continuous loss of nitrogen resources from soil due to draining, denitrification processes and plant uptake.

Even under modern agriculture, only a fraction of the crop need for nitrogen comes from synthetic inorganic and natural organic fertilizers, the remaining portion is satisfied through biological N_2-fixation. **Alexander (1977)** reported that an amount of 10^8 to 10^9 tons of nitrogen were introduced to the soil via biological N_2-fixation per annum.

Biofertilization with associative and symbiotic N_2-fixers gave appreciable increases in both grain and straw yields of different cereal crops **(Hegazi, et al 1979, Fouad, 1981; Hess, 1981; Ishac et al 1986 b; Subba-Rao, 1986; El-Borollosy et al 1986; Yousef, et al 1986; Saleh et al 1986; Arshad et al 1987; Abdel-Aziz et al 1989; Ishac et al 1991 a,b,c,d; El-Demerdash et al 1992, 1993).** The stimulatory effect of N_2-fixers on plant growth can attributed not only to N_2-fixation activity, but also to the production of growth promoting substances **(Reynders & Vlassak, 1982; El-Haddad, et al 1986).**