# STUDIES ON LEGUMES-MYCORRHIZA-RHIZOBIA SYMBIOTIC SYSTEM IN NEWLY RECLAIMED SOIL

BY



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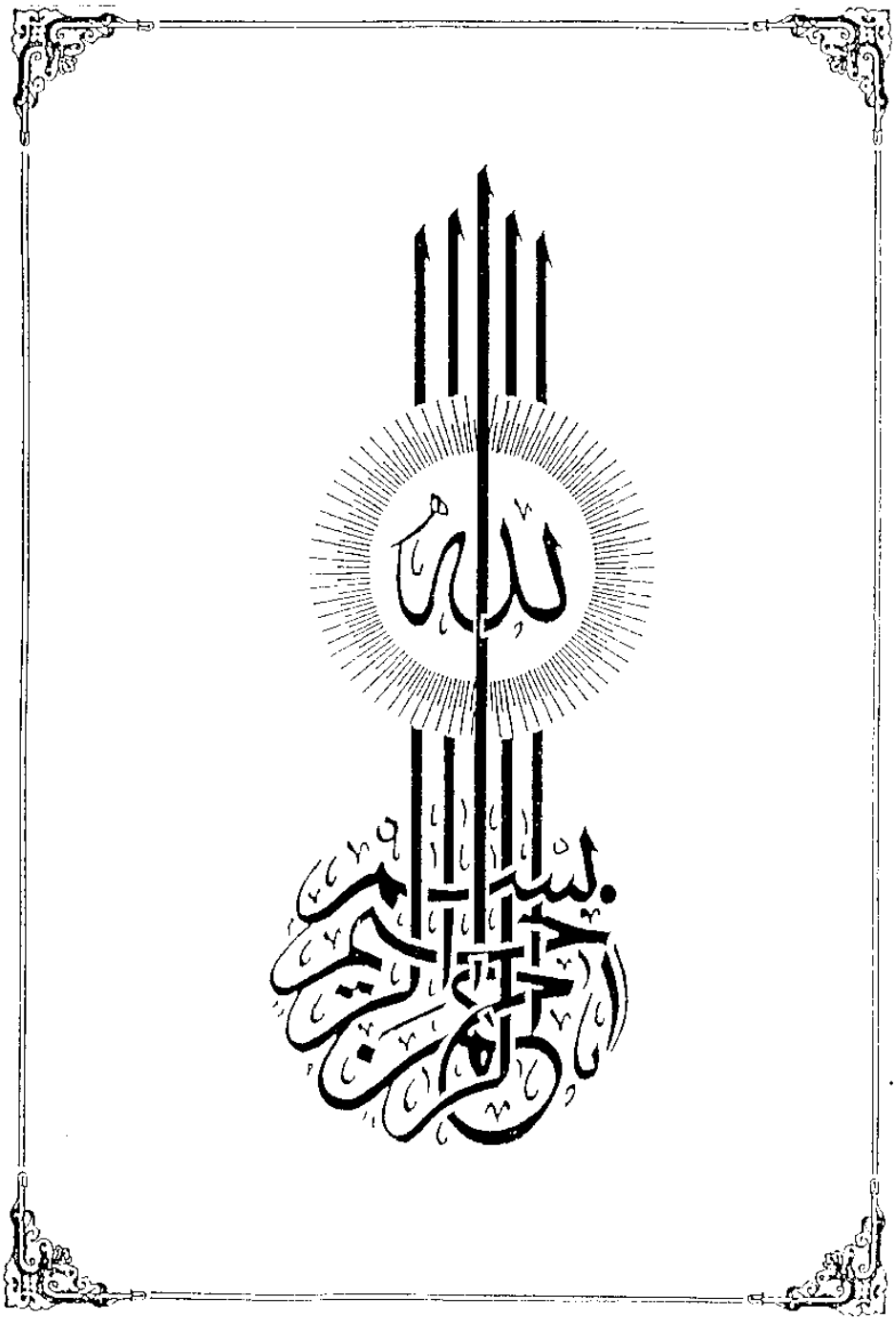

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Abstract

Under green house conditions, inoculation with either rhizobia or VA mycorrhizal for plants fertilized with nitrogen was different from that performed to plants subjected to phosphorus fertilization. Growth and nodulation were improved with P compared to N which frequently depressed nodulation. In contrary to that, P was inhibitory to a degree more than N was for both spore density and VAM infection percent. Association of both rhizobia and mycorrhiza improved significantly the studied plant growth parameters recorded at flowering stage, effect being mostly significant at maturity stage.

Soybean plants, grown under field conditions, positively

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# INTRODUCTION

# INTRODUCTION

The symbiotic relation between higher plants and soil microorganisms represents one of the most striking biological phenomenon. A classical example for this type of relation is that existing between legumes and *Rhizobium* which produces enough nitrogen to support the building of protein requirements of the legumes.

Because of the large indigenous population of rhizobia that are not fully effective in $N_2$ fixation, it is not surprising that supplemental inoculation with selected bacterial strains commonly results in significant agronomic responses. Under Egyptian conditions, inouclation with effective rhizobial strain, capable of surviving and competing successfuly with native infective rhizobial population, is a common practice for improving the fodder yield of Egyptian clover and seed yield of soybean.

The term mycorrhiza (fungus-root) has been first used, since (1885), when describing a non-pathogenic association of fungus with roots of several plants. Mycorrhizal associations are found in almost all plant habitats throughout the whole plant kingdom including that of symbiotic partnerships with bacteria that fix atmospheric nitrogen within root nodules nomely *Rhizobium* in legumes along with actinomycetes (*Frankia*) in certain non legumes.

The major visible benefit of mycorrhiza for plant growth is via phosphate nutrition as P is a major plant nutrient and P-deficient plants are usually stunted. In fact, it appears that many plants without mycorrhizae are incapable of absorbing adequate P, Fe, Mn, Zn, Cu and perhaps other nutrients from normally fertile agricultural soils. Infection of plant roots by vesicular-arbuscular mycorrhizal fungi (VAM) is frequently reported to be associated with enhancing growth and nitrogen uptake of plants, particularly, in soils where an insufficiency of plant available phosphate is limited. Accordingly, influence of mycorrhiza on legumes is potentially greater than for other plant groups due to alleviating P-stress to be suitable for symbiotic $N_2$ fixation.

Recent investigations suggest that plants may more efficiently use small dressings of soluble superphosphate along with less-soluble forms, such as rockphosphate, when they are mycorrhizal. So, utilization of Rhizobium—VAM association is a vital area for practical studies dealing with maximizing fertilizer efficiency to conserve energy, material resources and reduce costs of food production. This is particularly true with several Egyptian soils which are usually with high sorption capacity for P. Besides, activity