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بسم الله الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات

قسم التوثيق الإلكتروني



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها

على هذه الأقراص المدمجة قد أعدت دون أية تغييرات



Salwa Akl



بعض الوثائق الأصلية تالفة
وبالرسالة صفحات لم ترد بالأصل



***Rhizobium meliloti* - *Medicago*
sativa symbiosis in salt -
affected environments**

THESIS

B18385

Submitted In Partial Fulfilment Of The
Requirements For The Degree

Of

DOCTOR OF PHILOSOPHY

In

Agricultural Microbiology

By

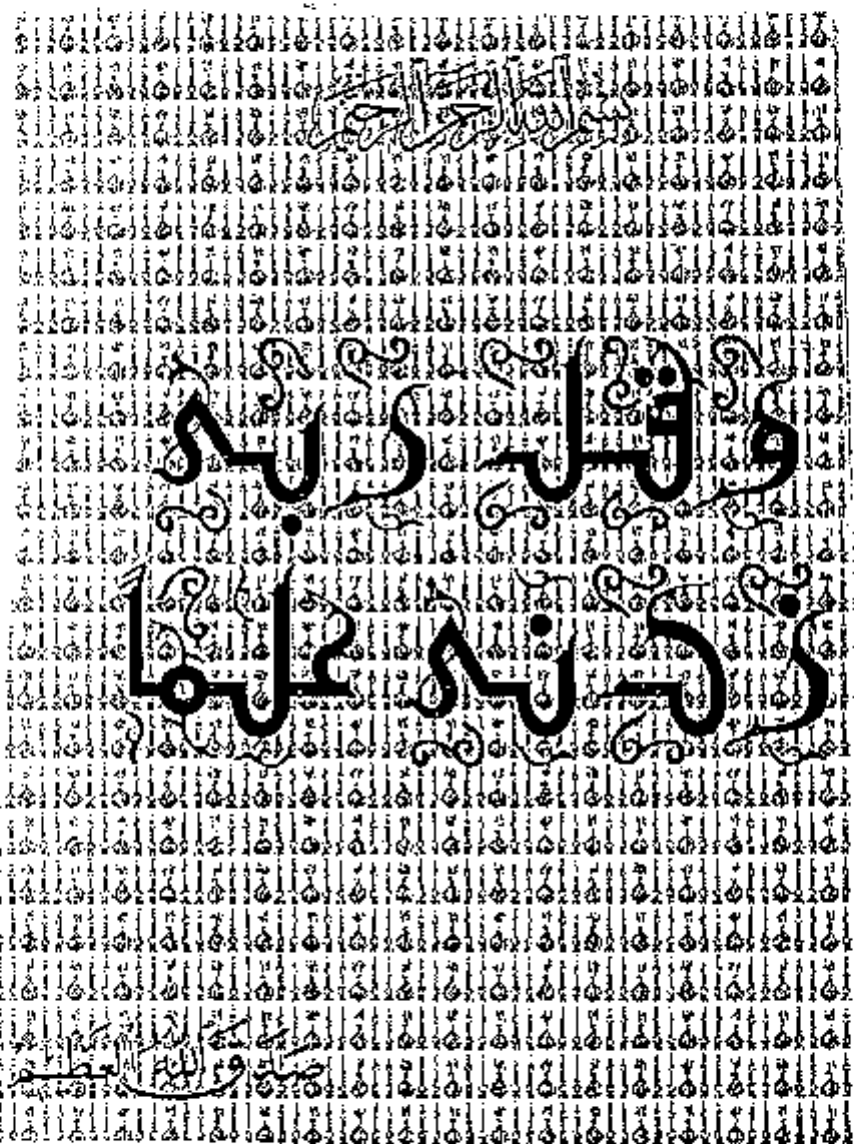
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DEDICATION

TO

my parents, brothers, sister, husband and son

who have given me much

LOVE and SUPPORT

ACKNOWLEDGEMENT

I would like to express my appreciation and deepest gratitude to Prof. Dr. M. K. Zahra, Professor of Agricultural Microbiology; Prof. Dr. M. Fayez, Professor of Agricultural Microbiology, Faculty of Agriculture, Cairo University and Prof. Dr. S. A. Saleh, Head Researcher, Department of Agricultural Microbiology; Soils, Water and Environment Research Institute, Agricultural Research Center (ARC), Giza for their valuable supervision, constructive criticism and continuous encouragement during the whole period of this study.

The authoress wishes to extend her thanks to Prof. Dr. S. A. Ibrahim, Professor of Microbial Genetics; A. B. Abdelrazik, Assistant lecturer of Microbial Genetics, Faculty of Agriculture, Ain Shams University and Dr. M. A. Nassef, Researcher, Agric. Microbiol. Dept.; Soils, Water and Environment Res. Instit., ARC for their kind help and providing all the facilities required in genetic diversity experiment.

Thanks presented to all the staff members of Agricultural Microbiology Department and to staff members of the Environmental Studies and Research Unit (ESRU), Agric. Microbiology Dep., Faculty of Agriculture, Cairo University and Biofertilization Unit, Department of Agricultural Microbiology; Soils, Water and Environment Research Institute, ARC, Giza, Egypt for their coopération.

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Title of Thesis	<i>Rhizobium meliloti</i> - <i>Medicago sativa</i> symbiosis in salt-affected environments"	
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Branch	Soil Microbiology	Approval 16/4/2000

ABSTRACT

The present work concerns with the possible improvement of *Rhizobium meliloti* - *Medicago sativa* symbiosis in salt - affected soils. A number of laboratory, greenhouse and field studies was conducted to clarify some aspects of this association. Eight *R. meliloti* strains were screened for their tolerance to increased NaCl concentrations (0.0 - 8.0%) on yeast extract mannitol (YEM) and minimal nitrate mannitol (MN) agar media. Results showed that all strains did withstand a concentration of 2.5% and all were susceptible to 8.0%. The amino acid pools of two *R. meliloti* strains (ARC 2, salt sensitive and B3, salt tolerant) grown in MN broth medium received different concentrations of NaCl (100 - 500 mM) were assayed. Results revealed that, for ARC 2 strain, 11 (ca. 65%) of the 17 assessed intracellular free amino acids were increased in response to osmotic stress by NaCl. Regarding B3 strain, 9 of the examined amino acids were increased as the salt quantity in MN medium increased to 500 mM. The eight *R. meliloti* strains were screened for superior symbiotic performance with 6 *Medicago sativa* cultivars in a pot experiment. Sewa cultivar positively responded, to the highest extent, to rhizobia inoculation where nodules produced approached 105 per pot against 42 for cv. Hegazi 4. Mixed culture of *Rhizobium* + associative diazotrophs + *Saccharomyces* together with 15 kg N fed⁻¹ induced good nodulation. Soil salinity negatively interacted with nodule biomass production. Response of *Medicago sativa* cultivar (Salt Tolerant) to N fertilization, organic manure and improved *R. meliloti* inocula was evaluated in moderately saline soil (EC. 6.6 dS m⁻¹). Alfalfa plants inoculated with triple inocula produced 27 nodules plant⁻¹ representing 230.9% increase over untreated ones. Inoculation, whatever the candidates, resulted in the accumulation of 20.75 - 38.39 g plot⁻¹ more N compared to untreated plants.

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Introduction

INTRODUCTION

Great efforts are currently made to improve forage and field crops production in the fertile Delta and adjacent newly reclaimed sandy soils. Introduction of the proper biofertilizers, to satisfy a part of plant needs of essential nutrients, is now among the necessary practices that should be considered under the umbrella of farm management. Unfortunately, environmental constraints somewhat restrict the success and performance of the introduced microbial preparations. Soil salinity represents a unique soil factor that certainly reflects on plant-microbe interactions.

The aim of the present study is to experiment the symbiotic performance of *Rhizobium meliloti* with *Medicago sativa* in salt - affected soils. A number of rhizobial strains and legume cultivars was screened for preliminary selection. The validity of the randomly amplified polymorphic DNA (RAPD) analysis for identification of various *Rhizobium meliloti* strains was investigated. Besides, greenhouse and field trials were executed to monitor the superior alfalfa-inocula interaction in salt - stressed environments for future applications and recommendations.

Review of Literature