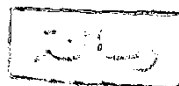


**EFFECTS OF MINERAL NUTRITION ON  
SURVIVAL AND SYMBIOTIC ASSOCIATION  
OF SOME RHIZOBIAL STRAINS**

**Thesis**

**Submitted in partial fulfilment  
of the requirements for the degree  
of  
Doctor of Philosophy  
In  
Botany (MICROBIOLOGY)**

589/95  
M.M



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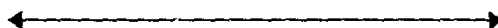
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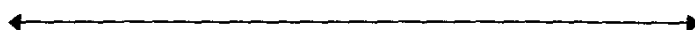
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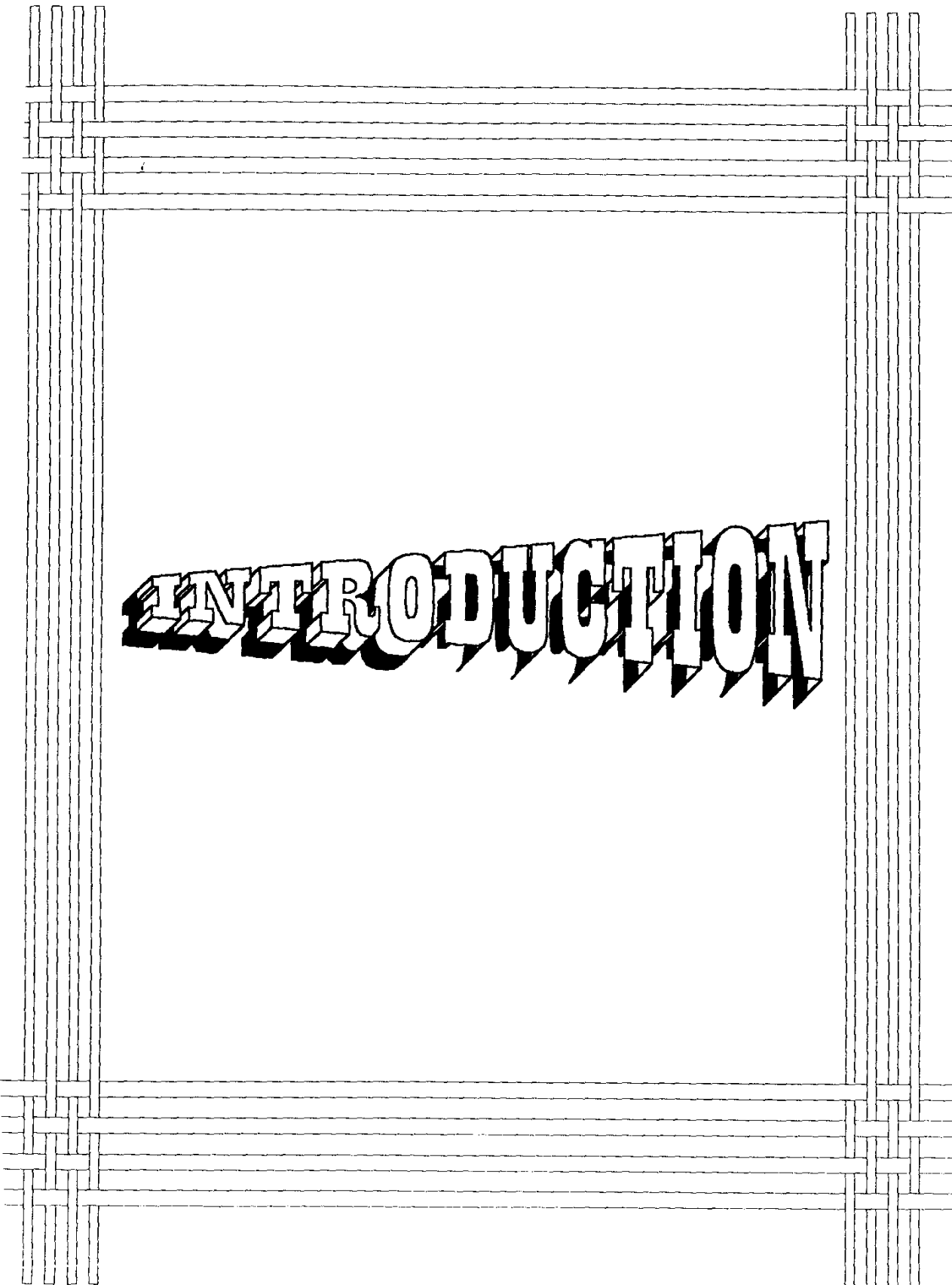
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# INTRODUCTION

## **1- Introduction**

When plant nutrient problems are observed in the field, one is faced with the question "what is the best and most economical way to solve this problem?". Actually, workers have used soil amendments to correct deficiencies of macro and microelements, this possible solution can be completed by using different kinds of microorganisms, which are known to play a vital roles in physiological processes in ecosystem. One of the most beneficial contributions of soil microorganisms to plant development is the supply of nutrients essential to plant growth.

In developing countries where food consumption exceeds production, the greater use of legumes can have a considerable beneficial effect, and therefore the symbiotic relationship between root-nodule of the genus *Rhizobium* and legumes is of special significance to legume production, as seed inoculation with effective strains of *Rhizobium* proved to be a beneficial practice to ensure effective nodulation, good growth and high yield.