

KADIR

Surname	
Sabaruddin	928 005 720
given names	I.D. number
Land Resource Science (Soil Science)	MSc
department/school	program

CERTIFICATE OF APPROVAL (MASTER'S THESIS)

The Examination Committee has concluded that the thesis presented by the above-named candidate in partial fulfilment of the requirements for the degree

Master of Science

is worthy of acceptance and may now be formally submitted to the Dean of Graduate Studies.

Interaction Between Bradrhizobium and Indigenous Mycorrhizal

Fungi on Nitrogen Fixation and Phosphorus Nutrition in Soybeans

D. S. Black

Chair, Master's Examination Committee

Hyflon

Advisor

B. S. S. S.

Paul Van

Chamiller

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ceived by:

Patch Hawkins
for Dean of Graduate Studies

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ABSTRACT

INTERACTION BETWEEN BRADYRHIZOBIUM AND INDIGENOUS MYCORRHIZAL FUNGI ON NITROGEN FIXATION AND PHOSPHORUS NUTRITION IN SOYBEANS

Sabaruddin Kadir
University of Guelph, 1994

Advisor:
Prof. M.J. Goss

Possible interactions between mycorrhizas and rhizobia in soybeans (*Glycine max* L. Merr. cv. Evans) were investigated in the greenhouse where temperature, lighting, and water supply were kept uniform. The P nutrition of soybean plants grown in undisturbed and disturbed soil was amended with 0, 20, 40, and 40 mg P kg⁻¹ soil. Nodulating and Non-nodulating isolines, were sown with and without Bradyrhizobium. Soils had previously been planted with three cycles of maize (*Zea mays* L. cv. Pioneer 3949).

Growth and P concentration in maize grown in undisturbed soil were greater than for plants from disturbed soil, consistent with previous work that had led to the conclusion that soil disturbance disrupted extra-radical mycelia of mycorrhizas, so reducing their effectiveness.

Soil disturbance decreased early growth in soybean. At podfill, plants in undisturbed soil contained more P and fixed more N₂ than plants from disturbed soil. Rhizobium inoculation increased fixation in disturbed soil but not in undisturbed soil. Addition of P could not offset all effects of soil disturbance.