Cytological and molecular studies on the effect of herbicides on *Rhizobium* spp. symbiotic with *Vicia faba*

By

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B.Sc. Agric. Sci. (Genetics), Ain Shams University (1994)

A thesis submitted in partial fulfillment
of
the requirement for the degree of

Master of Science

in
Agricultural Science
(Genetics)

Genetics Department
Faculty of Agriculture
Ain Shams University

2000

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Acknowledgement

My deepest thanks and gratefulness to who provide me all I have !!!

To ALLA

There are few opportunities in most people's lives to demonstrate formally one's gratitude to people who have been mentors and supporters at different steps of our lives. Even though, we do not forget to express our gratitude verbally, the thesis represents a great opportunity to stamp those feeling on paper.

I would like to express my sincere gratitude and deep appreciation to **Prof. Dr. El-Said Hassan Hassanein** professor of genetics, Department of Genetics, Fac. Agric., Ain shams Univ. for his kind and valuable not only supervision but also encouragement during the progress of this study and through all time which I stayed in his laboratories.

Deep thanks from the bottom of my hart to **Dr. Fotouh Mohamed El-Domyati** associate professor of genetics, Department of Genetics, Fac. Agric., Ain shams Univ. and **Dr. Wafaa Abdel-Nabby Mohamed** lecturer of genetics, Department of Genetics, Fac. Agric., Ain shams Univ. for their

sincere help, fruitful advising and valuable supervision not only at the scientific level but also at personal level.

Deep thanks to **Dr Ramzy El-Adawy** for his helpful guidance and support during the coarse of this thesis.

Thanks also extended to all members of **Molecular Cytogenetic Lab.,** especially **Mr. Ahmed Ramadan, Mr. Abdel sallam El-Tayeb** and **Mr. Ahmed Mansour** and also to all members of **Microbial Genetics and Environmental mutagenesis Lab.**

Thanks also to all members of Genetics Dept., Fac. Agric., Ain Shams Univ. for their faithful help during all stages of this study.

Sherif Edris

ABSTRACT

Sherif Edris Ahmed "Cytological and molecular studies on the effect of herbicides on *Rhizobium* spp. symbiotic with *Vicia faba*" unpublished Master of Science thesis, University of Ain Shams, Faculty of Agriculture, Department of Genetics, 2000.

Faba bean plays an important role in the national economy and agricultural production for its high nutritional value and various ways of utilization. This study was aimed to investigate the symbiotic relationship between faba bean and rhizobium as affected by some herbicides. Three cultivars of faba bean (Giza 2, Giza 714 and Giza 461) and one *Rhizobium leguminosarum* strain 481 were tested for symbiotic property in the present of three herbicides (Glyphosate [Roundup], Basagran and Fusilade) at different concentrations. Different parameters such as SDS-PAGE, plasmid profiles optical density (for rhizobium growth and % of leghaemoglobin) and inhibition zone experiment was used to determine the toxicity of these herbicides.

The effect of high dosage of herbicides was found to be more aggressive on faba bean than *Rhizobium leguminosarum* strain 481. The Basagran herbicide has a high toxicity effect on both faba bean and *Rhizobium leguminosarum* strain 481. The *Rhizobium leguminosarum* strain 481 showed the highest resistance and also recovery against Glyphosate (Roundup) herbicide, where the bacteria have biodegraded this herbicide to useful components.

On the other hand, proteins of both rhizobium and faba bean cultivars on the level of SDS-PAGE were effected by treatment with the three herbicides.

Key Words: *Vicia faba* - faba bean - *Rhizobium leguminosarum* -herbicide - symbiotic - plasmid - SDS-PAGE - biodegradation.

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