

BIOMANAGEMENT OF DIAZOTROPHS FIELD CROPS WEAVE IN SALT AFFECTED ENVIRONMENTS

By

HEBA BELAL ABDEL-SAMEI KANDIL

B. Sc. Agric. Sci., (Soil Science), Fac. Agric., Cairo Univ., 2006

M.Sc. Agric. Sci. (Agric. Microbiology), Fac. Agric., Cairo Univ., 2012

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APPROVAL COMMITTEE

Dr. KHALED ABDELFAHAT ELDUGDUG.....
Professor of Agricultural Microbiology, Fac. Agric., Ain-Shams University

Dr. AZIZ MOHAMED AZIZ HIGAZY.....
Professor of Agricultural Microbiology, Fac. Agric., Cairo University

Dr. MOHAMED ABDELALIM ALI
Professor of Agricultural Microbiology, Fac. Agric., Cairo University

Dr. MOHAMED FAYEZ FOUAD IBRAHIM.....
Professor of Agricultural Microbiology, Fac. Agric., Cairo University

Date: 15 / 5 / 2018

SUPERVISION SHEET

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SUPERVISION COMMITTEE

Dr. MOHAMED FAYEZ FOUAD IBRAHIM
Professor of Agricultural Microbiology, Fac. Agric., Cairo University

Dr. MOHAMED ABDELALIM ALI
Professor of Agricultural Microbiology, Fac. Agric., Cairo University

Dr. EMAN AHMED TANTAWY
Head Researcher of Agricultural Microbiology. SWERI, ARC, Giza

Name of Candidate: Heba Belal Abd El-Samei Kandil

Degree: Ph.D.

Title of Thesis: Biomanagement of Diazotrophs Field Crops Weave in Salt Affected Environments.

Supervisors : Dr. Mohamed Fayez Fouad
Dr. Mohamed Abdelalim Ali
Dr. Eman Ahmed Tantawy

Department: Agricultural Microbiology

Approval: 15 / 5 /2018

ABSTRACT

The objective of this work was to support growth and yield of faba bean and wheat grown under salt-affected conditions using inocula bacterial endophytes along with a *Rhizobium leguminosarum* strain. The examined endophytic bacterial strains isolated and characterized in a previous work were conclusively identified using 16S rDNA gene sequence analysis as *Pantoea agglomerans*, *Pseudomonas stutzeri*, *Klebsiella* sp., *Brevundimonas diminuta* and *Bacillus cereus*. These strains showed ability *in vitro* to produce plant growth promoting substances as ammonia (NH₃), produce hydrogen cyanide (HCN), as well as the ability to fix nitrogen, dissolve phosphate, Poly-β-hydroxybutyrate (PHB) in addition their intrinsic antibiotic resistance. Plant growth promoting ability of these bacteria was evaluated in a field experiment. Growth and productivity of wheat (*Triticum aestivum*) and faba bean (*Vicia faba*) were improved under high saline soil stress at Sahl El-Hossinia region, El- Sharkia governorate, Egypt due to inoculation with the endophytes. 100 seed and 1000 grain weights, protein concentration and yield were increased when inoculated with *P. agglomerans* and *Klebsiella* sp. weighing 96 g.100grains⁻¹, maximum grain protein of 16.9% was recorded with the single strain *Klebsiella* sp. inoculum and the highest total yield of 1580 kg.feddan⁻¹ in faba bean while that maximum grain weight reaching up to 45 g.1000 grains⁻¹ in wheat inoculated with *Klebsiella* sp. and *Brev. diminuta*. The highest seed protein accumulation was obtained as a result of inoculation with *P. agglomerans* and *Ps. stutzeri* (9.9 %) and total yield increased up to 1549 kg.fed⁻¹ when rhizobial strain combined with *Ps. Stutzeri*, respectively in wheat. Results referred to a possible role of the isolated endophytes as inocula strains for improving wheat and faba bean growth and productivity under salinity stress.

Key words: Soil salinity, endophytes, N₂-fixation, plant growth promotion, hydrogen cyanide, wheat, faba bean.

DEDICATION

This work is dedicated to whom my heartfelt thanks; to my parents, my brother (Ahmed), my sister (Aya) for their patience, my nephew (Mutayam) my best friend (Mariam), help and for all the support they lovely offered along the period of my graduation.

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CONTENTS

	Page
INTRODUCTION	1
REVIEW OF LITERATURE	5
1. Soil salinity as a local and worldwide agricultural threat	5
a. Soil salinity in Egypt.....	5
b. Soil salinity as a global agricultural threat.....	7
c. Effect of soil salinity on plants.....	9
2. Effect of soil salinity on wheat and broad bean	10
a. Wheat.....	10
1. Wheat and soil salinity	11
b. Broad bean.....	13
1. Importance of broad bean.....	13
2. Broad bean and soil salinity.....	14
3. Endophytic bacteria isolate	16
a. <i>Bacillus cereus</i>	16
b. <i>Brevundimonas diminuta</i>	20
c. <i>Klebsiella</i> sp.	21
d. <i>Pantoea agglomerans</i>	23
e. <i>Pseudomonas stutzeri</i>	26
f. <i>Rhizobium leguminosarum</i>	28
4. Mechanism of endophytic bacteria to improve plant growth and productivity in saline soil	30
5. Importace of 16S rDNA in identification of endophytic bacteria	33
MATERIALS AND METHODS	35
1. Study site and soil sampling	35
2. Irrigation water	35
3. Plant materials	35
4. Endophytic bacteria and <i>Rhizobium</i>	37
a. Bacterial endophytes.....	37
b. Molecular identification of the endophytic strains...	38
5. In <i>vitro</i> production of plant growth promoting substances by the endophytic strains	39
a. Phosphate solubilization production assay.....	39

b. Qualitative HCN estimation.....	40
c. Qualitative production of ammonia.....	40
d. Intrinsic Antibiotic Resistance (IAR)	41
e. Poly- β -hydroxybutyrate accumulation.....	42
f. In <i>vitro</i> antagonism among the endophytic bacterial strains in dual plate culture.....	42
6. Effect of single- dual and multi-strain endophytic bacterial inocula on faba-bean and wheat growth in saline soil.....	43
a. Inocula preparation.....	44
b. Peat-based inocula preparation	44
c. Inoculation method.....	45
d. Planting and mineral fertilizers regime	45
7. Plant analysis.....	47
a. Acetylene reduction assay (ARA)	47
b. Leaves chlorophyll content.....	48
8. Statistical analysis.....	48
9. Culture media.....	48
RESULTS	51
1. Molecular identification of endophytic bacteria.....	51
2. In <i>vitro</i> production of plant growth promoting substances by the endophytic bacteria.....	60
a. Hydrogen cyanide (HCN) production qualitatively	60
b. Ammonia production (NH ₃) by the endophytes.....	60
c. Phosphate solubilization qualitatively.....	60
d. Quantitative assessment of Poly- β -Hydroxybutyrate (PHB) production by the endophytes	61
3. Intrinsic antibiotic resistance by the endophytes.....	63
4. Effect of single-, double and multi-strain bacterial inocula on faba-bean growth in highly salt-affected soil.....	64
5. Effect of inoculation with the bacterial endophytes on faba bean yield parameters.....	73

6. Effect of single-, double- and multi-strain bacterial inocula on wheat growth in highly salt-affected soil.....	77
DISCUSSION	85
SUMMARY	99
REFERENCES	105
ARABIC SUMMARY	