BIOLOGICAL CONTROL OF ROOT -KNOT NEMATODE ON CUCUMBER PLANTS USING RHIZOBACTERIA

By

BEDOUR HOSNY AHMED ABD EL–RAHMAN
B.Sc. Agricultural Sciences (Plant Pathology), Ain Shams University, 2017

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ABSTRACT

Bedour Hosny Ahmed Abd El-Rahman; Biological control of root-knot nematode on cucumber plants using rhizobacteria, unpublished M.Sc. Thesis, Department of plant pathology, Faculty of Agriculture, Ain Shams University, 2017.

The root-knot nematodes described as sedentary endoparasites, and are known as the most harmful agricultural pests against a wide range of crops. This study was conducted to evaluate some rhizbacterial isolates and some soil amendments for controlling root-knot nematode under laboratory, greenhouse and field conditions. Nematode of *Meloidogyne incognita* and rhizobacterial bio-agents were isolated from infected cucumber plants which collected from Qualbia and Ismailia governorates.

Isolation and identification of rhizobacterial bio-agents were obtained three isolates which were *Bacillus amyloliquefaciens, Rhizobium rhizogenes* and *Serratia marcescens*. Which were identified according to morphological and biochemical characters and confirmed by using Biology test.

In vitro, rhizobacterial isolates showed significant on mortality and hatching of *M. incognita,* and all rhizobacterial treatments compared with the control as untreated treatments and with mocap 10%G, as nematicide. Isolates of rhizobacteria *B. amyloliquefaciens* and *R. rhizogenes* showed high efficiency on mortality and hatching of *M. incognita.* At concentration 10^8CFU/ml of isolate *B. amyloliquefaciens* showed the highest effective on the mortality and egg hatching of *M .incognita,* while *S. marcescens* isolate had the lowest effective.

Under greenhouse conditions, isolate of *B. amyloliquefaciens* showed the highest decrease on mortality of nematode individually soil and roots (developmental stages, females, number of eggs/ egg-mass) compared to the other treatments. *R. rhizogenes* isolate reached to the second level in reducing the nematode populations, while *S. marcescens*

isolate showed the lowest effective on nematode populations in soil and roots. Also, it was obvious that *M. incognita* population in both soil and roots was significantly suppressed with the rhizobacterial isolates treatments. Also, all treatments lead to increase in fresh weight and roots of cucumber plants. The treatment with *B.amyloliquefaciens* showed the highest value of percentage in the total plant fresh weight, while the treatment with isolate of *S. marcescens* gave the lowest value of percentage increase at fresh weight.

Results of soil amendments treatment showed that garlic (*Allium sativum*) treatment gave the highest decrease on mortality of nematode in soil and roots (developmental stages, females, number of eggs/ egg-mass) comparing to other treatment of Cabbage (*Brassica oleracea*) and Eucalyptus (*Eucalyptus* spp.). As well, in all treatments whit soil amendments it was obvious that *M. incognita* population density in both soil and roots was meaningfully inhibited and increase at all plan fresh weight of cucumber plants.

Under field conditions, results in all treatment obtained reduction in the nematode population. So, the nematode population declined regularly in soil and root of the treated plants. Then, significant reduction in nematode density achieved after two months or more excepting in numbers of nematode as a totals in soil and root samples were improved. In the final of experiment all the treatments gave suitable reduction in the nematode counts. All treatments improved % over control, and fresh weight of plants were greatly developed in both treatments of nematicide Mocap10%G, isolate of *B.amyloliquefaciens* and garlic (*Allium sativum*) treatments gave the highest of reduction of nematode population, while the treatment of *S.marsescens* isolate and eucalyptus (*Eucalyptus* spp.) gave the lowest effective.

Keywords: Biological control, Root-knot nematode, Soil amendments, Rhizobacteria, *Meloidogyne incognita*.

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Firstly, I direct my deepest thanks to our God, by the graces of whom the present work was realized

It is my immense pleasure and duty to express my sincere gratitude to **Prof. Dr. Nagy Yassin Abd El-ghaffar,** Professor of Plant Pathology, Plant Pathology Department, Faculty of Agriculture, Ain Shams University for direct supervision, her helpful suggestions, careful guidance, valuable comments during the course of the experimental work and revision of the manuscript.

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CONTENTS

LIST OF TABLES

LIST OF FIGURES