

**UTILIZATION OF SOME SOIL MICRO-
ORGANISMS FOR MANAGEMENT OF
ROOT-KNOT NEMATODES ON
CUCUMBER PLANTS**

By

HANAN MOHAMED ZAKARIA

B.Sc. Agric. Sc. (General Branch), Zagazig University, 1996

M. Sc. Agric. Sc. (Plant Pathology), Ain Shams University, 2006

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The thesis for Ph. D. degree has been approved by:

Dr. Samia Ibrahim Massoud

Prof. Emeritus of Plant Pathology and Nematology , Faculty of Agriculture , Suez Canal University

Dr. Mohamed Nagy Shatla

Prof. Emeritus of Plant Pathology , Faculty of Agriculture , Ain Shams University

Dr. Abdalla Shehata Mohammed Kassab

Prof. Emeritus of Agricultural Zoology , Faculty of Agriculture , Ain Shams University

Dr. Madih Mohamed Aly

Prof. Emeritus of Plant Pathology , Faculty of Agriculture , Ain Shams University

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استخدام بعض ميكروبات التربة في مكافحة نيماتودا تعقد الجذور على نباتات الخيار

رسالة مقدمة من

حنان محمد زكريا

بكالوريوس علوم زراعية (شعبة عامة) ، جامعة الزقازيق ، 1996
ماجستير علوم زراعية (أمراض نبات) ، جامعة عين شمس ، 2006

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(أمراض نبات)**

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للحصول على

**درجة دكتور فلسفة في العلوم الزراعية
(أمراض نبات)**

وقد تمت مناقشة الرسالة والموافقة عليها

الجنة:

د. سامية إبراهيم مسعود

أستاذ أمراض النبات والنيماتودا المتفرغ، كلية الزراعة، جامعة قناة السويس

د. محمد ناجي شتلة

أستاذ أمراض النبات غير المتفرغ، كلية الزراعة، جامعة عين شمس

د. عبد الله شحاته محمد كساب

أستاذ الحيوان الزراعي المتفرغ، كلية الزراعة، جامعة عين شمس

د. مديح محمد علي

أستاذ أمراض النبات المتفرغ، كلية الزراعة، جامعة عين شمس

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M. Sc. Agric. Sc. (Plant Pathology) , Ain Shams University , 2006

Under the supervision of:

Dr. Madih Mohamed Aly

Prof. Emeritus of Plant Pathology, Department of Plant Pathology, Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Dr. Abdalla Shehata Mohammed Kassab

Prof. Emeritus of Agricultural Zoology , Department of plant protection Faculty of Agriculture , Ain Shams University

Dr. Muhammad Shamseldean Mostafa Shamseldean

Prof. of Entomology , Department of Zoology and Agricultural Nematology , Faculty of Agriculture , Cairo University

Dr. Mona Mansour Mahmoud Oraby

Associate Prof. of Microbiology , Department of Microbiology , Faculty of Agriculture , Ain Shams University

ABSTRACT

Hanan Mohamed Zakaria: Utilization of Some Soil Microorganisms for Management of Root-knot Nematodes on Cucumber plants Unpublished Ph. D. Thesis, Department of Plant Pathology, Faculty of Agriculture, Ain Shams University, 2012.

Isolation and identification trials of fungal bio-agents resulted in five isolates of *Trichoderma* spp. and two isolates of *Verticillium* spp. The most effective isolates on percentage mortality and hatching of *Meloidogyne incognita* were identified as *T. harzianum* and *V. chlamydosporium*. Effects of all forms of propagules suspension and culture filtrate were increased by increasing the concentration and incubation period. Two obtained isolates of entomopathogenic nematodes-symbiotic bacteria, *Photorhabdus luminescens* and *Xenorhabdus hominickii* showed high efficiency on mortality and hatching of *M. incognita*. Temperatures regimes and storage periods had a great effect on the shelf life of culture filtrates of *P. luminescens*. Longevity of the chlamydospores of *V. chlamydosporium* was able to persist for 6 months in two forms of formulations, alginate granules and vermiculite paste, which were the most suitable forms. The effect of stored formulated products of *V. chlamydosporium* on mortality and hatching of *M. incognita* was gradually decline by increasing the period of storage, especially under room temperature.

Results from pot experiments revealed that, *V. chlamydosporium*(10^7) + CF of *P. luminescens* caused a decreasing number of galls, females, egg-masses and immature stages per root system and number of IJ₂ in soil and total number of nematodes. Moreover, the same treatment caused a significant positive effect on the high vegetative growth of cucumber plants. All treatments with the various formulated products of *V. chlamydosporium* mixed with kaolin powder, alginate

granule or vermiculite paste resulted a significant reduction in nematode infection parameters compared with control. Also, all treatments resulted an improvement in the high vegetative growth.

Simulated field studies showed the greatest role of the soil treatment with *V. chlamydosporium* and *P. luminescens* (alone or in combination) compared to nematicide treatment with Oxamyl 24% SL, in controlling of root-knot nematode *M. incognita* in cucumber plants. When the soil was applied with *V. chlamydosporium* + *P. luminescens* joining with animal compost (AC), caused the highest reduction effect on all nematode infection criteria followed by the treatment with *P. luminescens* + AC compared with control. All soil treatments with *V. chlamydosporium*, *P. luminescens* and soil different soil amendments (alone or in combination) caused an improvement in top vegetative growth compared with control.

Key Words: Biological control, Nematophagous fungi, *Trichoderma harzianum*, *Verticillium chlamydosporium*, *Photorhabdus luminescense*, *Xenorhabdus hominickii*, Soil amendments *Meloidogyne incognita*.

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