INJURIOUS FRUIT TREES MITES AND ITS CONTROL BY FUNGI

By

HALA FOUAD ALI AHMED EWIES

B.Sc. Agric. Sci. (Plant Pathology), Fac. Agric., Ain Shams Univ., 1998
H.S.Dip. (Organic Farming), CIHEAM-Bari, Italy, 2001
M.Sc. Agric. Sc. (Plant Pathology), Ain Shams University, 2008

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In

Agricultural Sciences

(Agricultural Zoology-Acarology)

Department of Zoology and Agricultural Nematology
Faculty of Agriculture
Cairo University
EGYPT

2021

Format reviewer Vice dean of graduate studies

Name of Candidate: Hala Fouad Ali Ahmed Ewies **Degree:** Ph.D.
Title of Thesis: Injurious fruit trees mites and its control by fungi.
Supervisors: Dr. Mohamed Samy Nawar.
Dr. Mohamed Abd El-Aziz Zaher
Dr. Magdi Mohmed Hussien Fawzy

Department: Zoology and Agricultural Nematology **Branch:** Acarology
Date: / / 2021

ABSTRACT

Plant mites are the most important pests of orchids in Egypt, especially the economic ones, which when infected with different types of mites lead to loss of their aesthetic and export value. And in view of the recent global trends to get rid of agricultural pests, in order to use natural enemies to reduce the use of harmful chemical pesticides in the control. The insect pathogenic fungi are considered an important vital factor in the control and not a recent one. Consequently, the study aims to use the insect pathogenic fungi to control the mites that infest some fruit trees in 7 different regions in Egypt.

An inventory of mites was carried out on different fruit trees at the governorates of Beheira, Giza, Qalyubia Gharbia, Ismailia, Dakahlia, and Faiyum. The entomopathogenic fungi of mites were isolated from the dead individuals (cadavers) and coded (H1 to H20). The study resulted in identifying 3 fungal species: *Moellerella sloaneae* isolate (H3), *Aschersonia abnormis* isolate (H6) and *Metarhizium anisopliae* isolate (H8). Whereas the *Moellerella sloaneae* fungus was first recorded in Egypt.

Through the study, some isolated fungi were purified and multiplied on different industrial environments, the intensity of growth was evaluated under incubation conditions and at room temperature, and the best environment for the best growth was shown for later use on a large scale. The severity of the infection, its efficacy, and its reproducibility were studied on the large wax worm (*Galleria mellonella*).

The use of isolates H3, H6, H8, and H15 in the study was applied in the laboratory using Metamet and Newfar and compared with Vertimec as chemical pesticide, and their effectiveness was estimated on 3 economic mites on fruit trees: *Tetranychus urticae*, *Eutetranychus orientalis*, and *Brevipalpus phoenicis*.

Also, the field was studied on 4 types of fruits in 4 different governorates using the bio-pesticides Metamet and Newfar compared to the chemical pesticide Vertimec.

This study was carried out to isolate pathogenic fungi from mites that infect economic fruit trees, purely from the Egyptian environment, to be commercially re-produced and used in biological control as an alternative to the use of harmful chemical pesticides.

Key words: Entomopathogenic fungi, plant mites, fruit trees, Egypt.

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF FIGURES