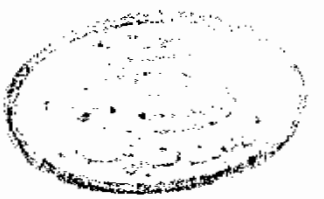
ECOLOGICAL AND BIOLOGICAL STUDIES OF SOME SOIL PREDACIOUS MITES IN CITRUS ORCHARDS

A THESIS



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The Faculty of Science,
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In Partial Fulfillment of the Requirement for the
M.Sc. Degree

By

SAHAR IBRAHEIM EL-SAYED AFIA
(B. Sc.)

Supervisors
Professor Dr. Bahira M. El-Sawaf.
Professor Dr. El-Sayed El-Banhawy.
Professor Dr. Hamida A. Osman.

DEPARTMENT OF ENTOMOLOGY
FACULTY OF SCIENCE
AIN SHAMS UNIVERSITY

(1995)

EXAMINATION COMMITTEE

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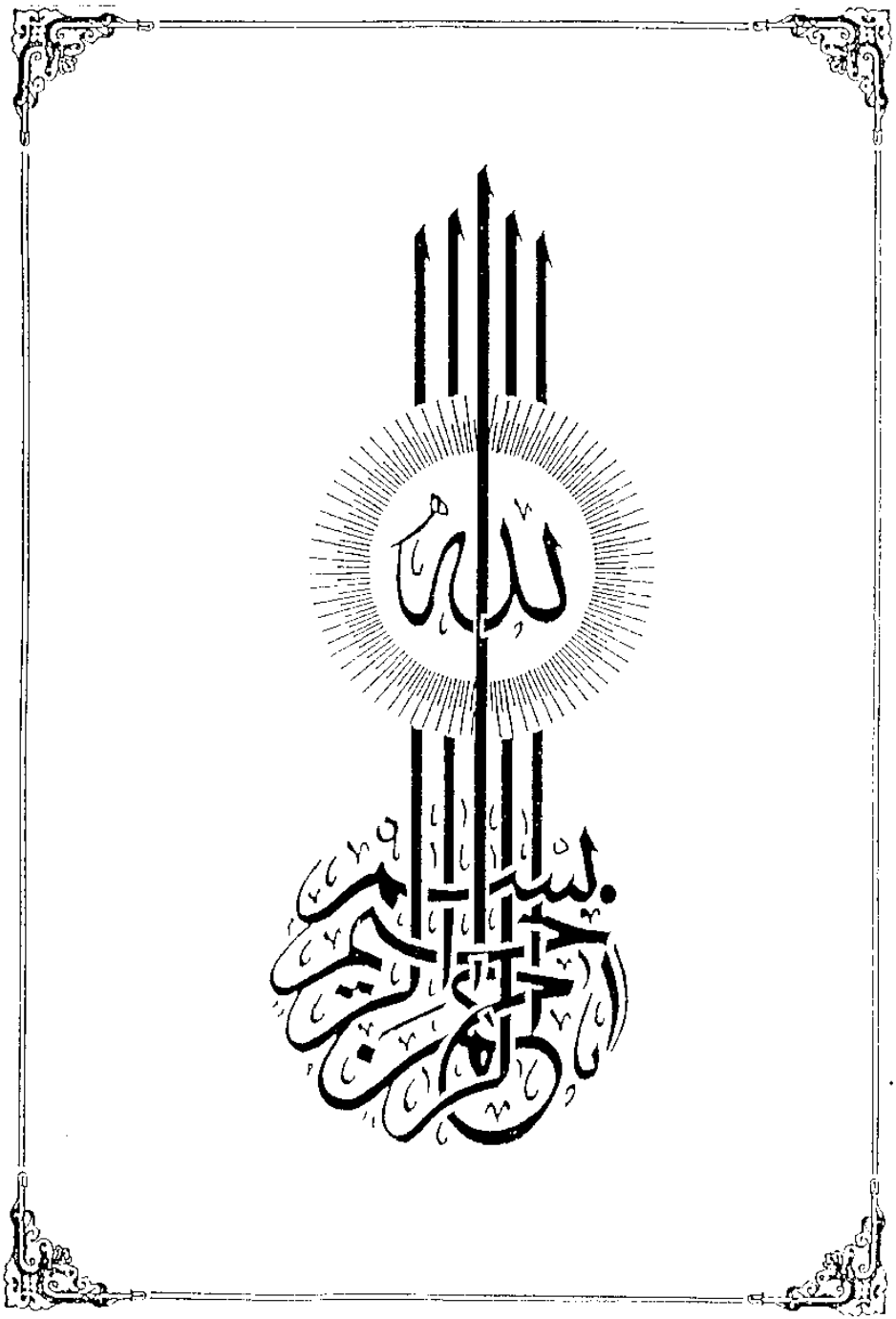

BIOGRAPHY

- **Date and place of birth:** 24 October, 1965; Sharkia Governorate.
- **Date of graduation** : May, 1987.
- **Degree awarded** : B. Sc. in Entomology.
  1987 (Excellent).
- **Occupation** : Assistant investigator, Pests and Plant Protection Department, National Research Centre.
- **Date of appointment** : 1st March, 1989.

- **Supervisors** : Professor Dr. Bahira M. El-Sawaf.
  Professor Dr. El-Sayed El-Banhawy.
  Professor Dr. Hamida A. Osman.

Head of the Department:

Professor Dr. Bahira M. El-Sawaf.

COURSES STUDIED BY THE CANDIDATE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE (M. Sc.) DEGREE

Language : (English M. Sc. Course).

Examination passed in October, 1990.

- Entomology Courses:

1- Advanced physiology.

2- Insect Hormones.

3- Insect Pheromones.

4- New approach in insect control.

5- Chemistry of insecticides.

6- Principles of insect taxonomy.

7- Environmental pollution.

8- Radiation biology.

9- Instrumental analysis.

10- Histochemistry.

11- Comparative anatomy.

12- Genetics.

13- Ecology.

14- Microbiology.

Examination passed in September, 1990.

- Computer.

Examination passed in September, 1990.

- **Supervisors :**

: Professor Dr. Bahira M. El-Sawaf.

: Professor Dr. El-Sayed El-Banhawy.

: Professor Dr. Hamida A. Osman.

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GENERAL INTRODUCTION

Mankind, ever since his existence on earth, has inherited cultivation and learn to get his nutritional needs in form of seeds, fruits etc.. from plants. To increase the soil production potentials he learnt to apply different sources of fertilizers; primary the organic matter and later the chemical fertilizers. Recently agriculturists documented tremendous drawbacks and degradation in soils (accumulation of toxins, decrease in beneficial microorganisms and extinction of major natural enemies), after decades of heavy and continuous application of chemical fertilizers. To avoid such disadvantages and to increase the soil quality, scientists, instead, recommended, the application of organic or biofertilizers in the agrosystem. Ecologically this application improves the soil physical and chemical properties and preserve the community of natural enemies which in turn diminish the populations of invertebrate pests like plant parasitic nematodes causing a minor damage. The present work was designed in the shadow of this idea considering a citrus orchard (sustainable agrosystem), mesostigmatid predacious mites (principal natural enemies) and the citrus nematode (major invertebrate pest). The various distributions and diversities of the predacious mites versus that of nematodes and the interrelationships of both populations were studied under different regime of fertilizers (organic, chemical fertilizers or combinations). Some biological aspects and the feeding behaviour of common predacious mites in the orchard were included in the study, claiming an interpretation of complex environmental interrelationships.

PART - I

Ecological studies of soil predacious mites in citrus orchard under different regime of fertilizers

1- INTRODUCTION

The mesostigmatid mites are prominent predators in soil community. The majority are facultative predators feeding on micro-arthropods, fungi or nematodes (Karg, 1961; El-Badry, 1972; Vande Bund, 1972 and Walter and Lindquist, 1989). The minority, on the other hand, are specialized predators feeding on nematodes (Habeersaat, 1989; Sharma, 1971 and Walter and Ikonen, 1989). In citrus groves, mesostigmatids can be a principal biological control agent for the citrus parasitic nematode, *Tylenchulus semipenetrans* Cobb. In a survey of Florida citrus groves, predacious mesostigmatid mites were associated with citrus roots (Kaplan, unpubl.). Likewise, in an unproductive old greenhouse culture of the citrus nematodes, *T.semipenetrans*, in Florida, there were a well-developed fauna of predacious mites which were defined as nematophagous. In boxes cultures nematophagous mites densities were 2.5-25 times higher than densities in citrus commercial groves infested with nematodes (Walter et al 1993). The citrus nematode, like most of the citrus producing regions, occurs in Egypt and limits production of citrus fruits (Abd-Elgawad *et al.*, 1994). Although control measures depend heavily on nematicidal application, little is known about the soil predacious mites and their potentials as natural bio-agents of this nematode. The present work was designed to study this possibility considering:

- Specific distribution of predacious mites and pattern of diversity according to regime of fertilizers versus nematodes distribution and diversity.
- Effect of regime of fertilizers on the number of predators and nematodes during the course of study.