BEHAVIOUR AND VECTOR COMPETENCE OF SANDFLIES IN RELATION TO LEISHMANIA IN RODENT RESERVOIR HOSTS

A THESIS

Submitted in partial fulfilment of the requirements for the award of the Degree of Master of Science

BY

MAHMOUD MOHAMED IBRAHIM WAHBA

B.Sc.

Department of Entomology

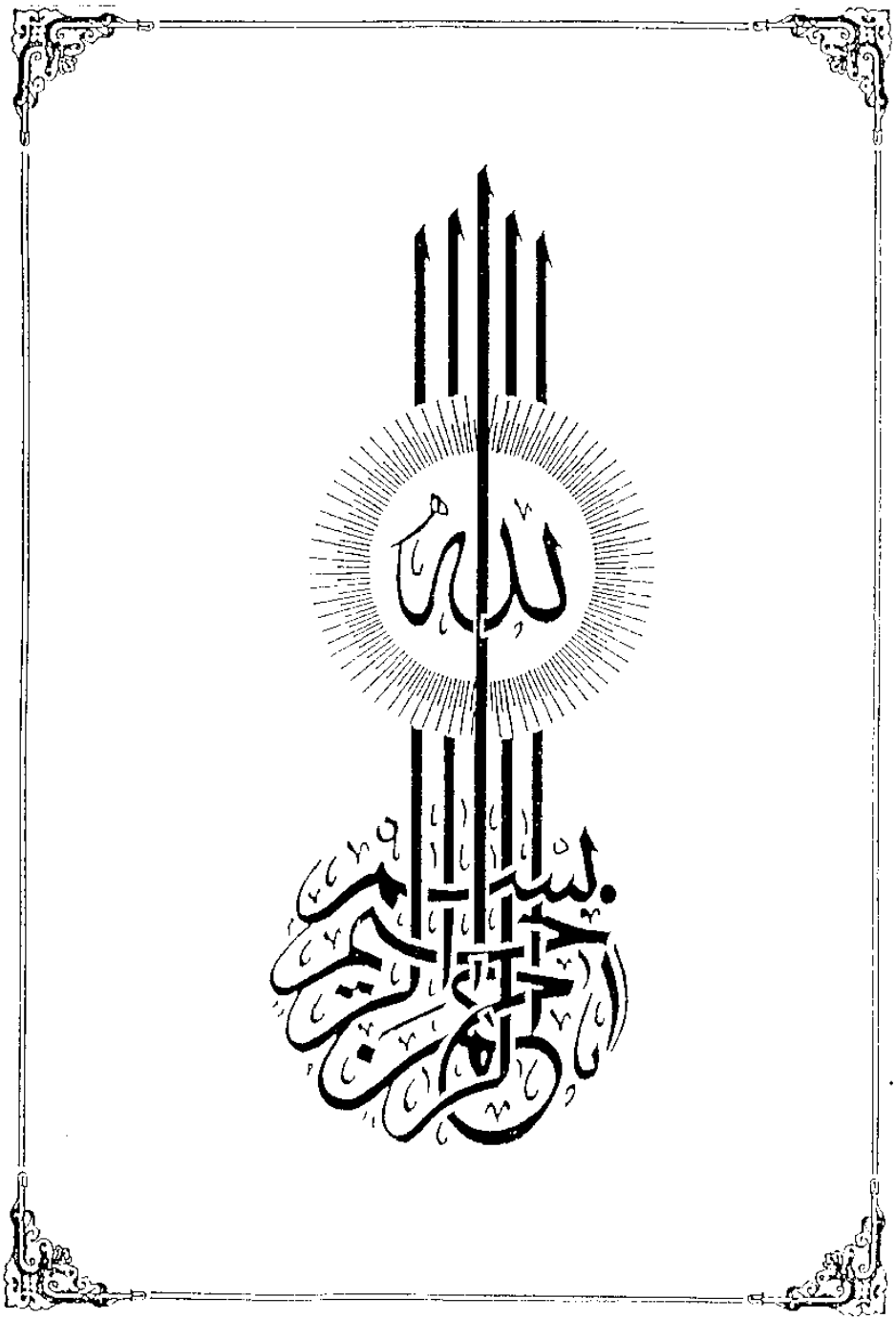
Faculty of Science

Ain Shams University

1986

THESIS EXAMINATION COMMITTEE

NAME	TITLE	SIGNATURE



B I O G R A P H Y

DATE AND PLACE OF BIRTH: 4.8.1954 - Cairo.

DATE OF GRADUATION : May 1978.

DEGREE AWARDED : B.Sc.

GRADE : Good.

OCCUPATION : Senior technician, Research and Training Center on Vectors of Diseases, Ain Shams University, Faculty of Science Building.

DATE OF APPOINTMENT : 1983.

DATE OF REGISTRATION : January 1985.

SUPERVISORS : Prof. Dr. Bahira M. El Sawaf, Dr. Magdi G. Shehata, Entomology Department, Faculty of Science, Ain Shams University.

Prof. Dr. Tosson A. Morsy, Parasitology Department, Faculty of Medicine, Ain Shams University.

COURSES STUDIED BY THE CANDIDATE IN PARTIAL FULFILMENT FOR THE DEGREE OF MASTER OF SCIENCE

Language: German , M.Sc. course
Examination passed on Oct. 1984.

Entomology:

1. Environmental pollution.
2. New approaches to insect control.
3. Microbial control of insects.
4. Insect Taxonomy.
5. Chemistry of pesticides.
6. Radiobiology.
7. Insect hormones and pheromones.
8. Research subject.
9. Population dynamics.
10. How to write and publish a scientific paper.

Examination passed on September 1984

Statistical Course : Bio-statistics

Examination passed on September 1984

ACKNOWLEDGEMENTS

The present work has been carried out in Research and Training Center on Vectors of Diseases, Ain Shams University.

The candidate wishes to express his sincere gratitude to who shared in suggesting the topic of research, outlined the scheme of the study, supervised the work to its and assisted it throughout the period of the study; namely Dr. Bahira El Sawaf, Professor of Entomology, Department of Entomology, Faculty of Science, Ain Shams University. Dr. Tosson Morsy, Professor of Parasitology, Department of Parasitology, Faculty of Medicine, Ain Shams University. Dr. Magdi Shehata, Lecturer, Department of Entomology, Faculty of Science, Ain Shams University.

The candidate is also indebted to Dr. Sherif El Said, Principal Investigator of the Project "Epidemiology and Control of Arthropod-Borne Diseases in Egypt" supported by grant No. No1 AI 22667/NIH-NIAID, for his continuous guidance and invaluable help and suggestions throughout the course of this work.

My expression of gratitude to Professor Dr. Adel Merdan, Director of Research and Training Center on Vectors of Diseases, Ain Shams University, for his encouragement.

The candidate wishes to thank all the staff members at the Rodent Control Center, Alexandria, headed by Mr. Mohamed El Kady for their great help in collection of rodents.

Special deep thanks are due to Dr. Mohamed Kenawy, Lecturer, of Entomology at the Department of Entomology, Faculty of Science, Ain Shams University for his help in designing the tables and statistical analysis of data.

The candidate's gratitude should also be expressed to all staff members and colleagues of Ain Shams Research and Training Center on Vectors of Diseases and of the Entomology Department for their help and cooperation throughout the period of this study.

TABLE OF CONTENTS

I. INTRODUCTION

I. INTRODUCTION

An epidemic of infantile visceral leishmaniasis occurred in El Agamy, Alexandria governorate in 1982. El Agamy is considered to be a focus where the epidemiology of visceral leishmaniasis can be studied, although the number of recorded patient cases in the area was very low (Tewfik et al. 1983).

The distribution and density of the Phlebotomine species was studied, and Phlebotomus papatasi and Phlebotomus langeroni were found to be the dominant species (El Sawaf et al. 1984).

The low prevalence of human and canine cases (Azab et al. 1984) and the presence in the area of a high density of wild animals give the impression that the disease was principally a disease of wild mammals, as observed in other parts of the world (Garnham, 1971; Ashford et al. 1977). In addition certain rodent species are regarded as important producers of shelters and breeding places of sandflies of the genus Phlebotomus. Several of these sheltered sandfly species are regarded as suitable vectors of leishmaniasis.

At the same time the rodents might serve as additional source of feeding for sandflies and occasionally secondary reservoirs. This has been observed in Malakal city in the Sudan in 1969 (Hoogstraal and Heyneman).

In Iraq Leishmania was rccovered from a black rat in the Baghdad area (El Adhami, 1976). In Italy, Bittini et al. (1980) also isolated Leishmania donovani from three black rats, Rattus rattus , this finding raises the possibility that black rat may serve as a reservoir host for leishmaniasis.

Some strains of leishmaniasis have been recently isolated from dogs and rats in Alexandria (Azab et al. 1984; and Morsy et al. 1985).

In the present work an effort is made to investigate:

a] The sandfly species, inhabiting rodent burrows.

b] Searching for Leishmania parasites in rodents trapped near the area of study, as well as in sandfly species encountered.

c] The susceptibility of sandfly species to infection with Leishmania parasites through feeding on experimentally infected rodents.

This investigation may assist those who are responsible for organizing and implementing the control of and research into this disease.

II. LITERATURE REVIEW

II. LITERATURE REVIEW

1. Historical background of Phlebotomine sandflies in Egypt

The first member of Phlebotomidae to be represented from Egypt was Phlebotomus papatasi, by Willcoks (1917). Later on Khalil (1934), proved that it was the vector of cutaneous leishmaniasis that occurred east of Delta. Sabin et al. (1944), proved that the local P. papatasi in our country was the vector of the papataci fever.

Other Phlebotomidae that were reported from Egypt, are P. minutus collected by Eflatoon in 1922 from the northern area of Cairo, samples of which are present in the Museum collection of the Entomological Society of Egypt.

Khalil (1934) reported Sergentomyia squamipleuris from Sharkiya Governorate during a leishmaniasis study and in 1948, Theodor added another anthropophilic species P. sergenti from metropolitan Cairo. During a survey to find visceral leishmaniasis vectors, Hassan (1968) added S. tiberiadis to the faunal list.

Zein El Dine (1972) made the first attempt at a Phlebotomine survey in Egypt, concentrating on the Baharia,