بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

THE EFFECT OF SOME NATURAL COMPOUNDS ON THE BLACK CUTWORM

Agrotis ipsilon (Hufnagel)

(Lepidoptera : Noctuidae)

A THESIS

Submitted to the Faculty of Science

Cairo University

In

Fulfillment For The Degree of Doctor of Philosophy (Ph.D.)

in

Entomology (Insect Control)

By

Hanan Hamdy Awad

B. Sc. (Insect Control)
M. Sc. (Insect Control)

DEPARTMENT OF ENTOMOLOGY
FACULTY OF SCIENCE
CAIRO UNIVERSITY
2001

بسم الله الرحمن الرحيم

شهد الله أنه لا إله إلا هو والملائكة و أولو العلم قائما
بالقسط لا إله إلا هو العزيز الحكيم

" سورة آل عمران 18 "

There is no god but He: That is the witness of God, His angels and those endued With Knowledge, standing Firm On justice. There is no God but He, The Exalted in Power The Wise.

APPROVAL SHEET

Title of the Ph.D. Thesis

The Effect Of Some Natural Compounds
On The Black Cutworm
Agrotis ipsilon (Hufnagel)
(Lepidoptera : Noctuidae)

Name of candidate

Hanan Hamdy Awad

Submitted to

The Faculty of Science, Cairo University

Supervision Committee.

1- Prof. Dr. Aly Aly El Moursy Aly A El-Moursy

2- Prof. Dr. Aziza Mohamed Fouad El Sharaby Aziza El Shalaby

Head of Entomology Department

Prof. Dr. Safia Hassan Ahmed

Safia Hassan Ahmed

This work is

Dedicated

To my parents, sisters and brothers

&

To my husband

In gratitude, devotion and love

&

To my lovely children

Contents

PAGE

ACKNOWLEDGEMENT

I- INTRODUCTION 1

II - REVIEW OF THE LITERATURE 3

1- Acceptability and antifeeding properties of plants 3

2- Insecticidal effects of plant extracts 5

3- Biological activity of plant essential oils 9

4- Insecticidal effects of terpenes 13

III - MATERIALS AND METHODS 20

1- Rearing techniques Mass rearing of the black cutworm *A. ipsilon* (Hufn.) in the laboratory 20

2- Acceptability of some plants against the black cutworm *A. ipsilon* 21

3- Biological effect of some medicinal plant extracts on the black cutworm *A. ipsilon* 23

a- plant materials 23

b- Preparation of the extracts 23

c- Ovicidal test 23

d- Larvicidal test 24

e- Antifeeding tests 24

1- Percent of starvation 24

2 - Antifeedant activity 25

f- Biotic potential test 25

PAGE

4- Insecticidal effect of different natural medicinal plant oils against the black cutworm ***A. ipsilon*** larvae 27

a- Plant materials 27

b- Preparation of water emulsion of plant oils 27

c- Insecticidal activity 27

5- Biological activity of some terpenes against the black cutworm ***A. ipsilon*** larvae 28

a- Plant materials 28

b- Preparation of water emulsion of the tested terpenes 28

c- Biological effects 28

4 – RESULTS AND DISCUSSION 30

1- Bioassay techniques 30

1.1- Acceptability and antifeeding properties of some plants against the black cutworm ***A. ipsilon*** 30

2- Biological activity of essential oils of some medicinal plants 34

2.1- Biological activity of the essential oils of *Tephrosia nubica* plant against the black cutworm ***A. ipsilon*** 34

i- Ovicidal action 34

ii- Larvicidal action 35

iii- Antifeedant action 38

iv- Biotic potential action 38

2.2- Biological activity of the essential oils of ***Dodonaea viscosa*** plant against the black cutworm ***A. ipsilon*** 42

i- Ovicidal action 42

ii- Larvicidal action 44

PAGE

iii- Antifeeding action 53

iv- Biotic potential action 60

2.3- Biological activity of essential oils of ***Matricarie recuita, Anethum graveolens*** and ***Mentha spicata*** plants against the black cutworm ***A. ipsilon*** 63

i- Larvicidal action 63

ii- Antifeeding action 63

3- Insecticidal effects of different natural medicinal plant oils against the black cutworm ***A. ipsilon*** 68

4- Biological activity of some terpenes against the black cutworm ***A. ipsilon*** 71

V –SUMMARY 79

VI – REFERENCES 83

VII - ARABIC SUMMARY .....

Acknowledgement

I would like to raise my thanks to God that this work has been completed.

I wish to express my deep gratitude and thanks to Prof. Dr. Aly Aly El Moursy, Department of Entomology, Faculty of Science, Cairo University and Prof. Dr. Aziza El Sharaby, Department of Plant Protection, National Research Center, for their kind supervision, guidance and valuable suggestions and advice throughout the work.

Thanks are also due to the members of the Department of Entomology, Faculty of Science, Cairo University, for their contribution in various ways to make this study possible.

The facilities provided by the National Research Center are greatly appreciated

Last but not least, I would like to express my sincere gratitude and respect to my parents, sisters and brothers for their love and care.

My everlasting gratitude and respect are also due to my devoted husband Dr. Moustafa, who has been a pillar of support to me and with love provided me with peace of mind.

INTRODUCTION

I. INTRODUCTION

The black cutworm *Agrotis ipsilon* (Hufn.) has long been established in Egypt as a major pest of cotton and other vegetable plants.

A. ipsilon larvae usually infest the winter crops including clover (*Trifolium alexandrinum*), wheat (*Triticum vulgare*), barley (*Hordeum vulgare*) and bean (*Vicia faba*), as well as the early summer crops including essentially the seedlings of cotton (Willcocks and Bahgat, 1937 ; Nasr and Naguib, 1963 and Beheedy, 1982).

In recent years, the economic importance of this pest increased, as the annual losses in the cotton crop especially in Upper Egypt due to their ravages were often tremendous. This stimulated some entomologists in this country to direct most of their efforts to control studies, especially by using chemicals. However, many problems have been encountered as a result of the extensive use of synthetic insecticides. Plants synthesize many secondary substances, which have great potential as alternative insect control agents. Intensive research has been conducted in Egypt as well as other countries on the biological control effects of plant extracts against agricultural insect pests.

Several plant extracts and /or their isolated active compounds have exhibited enormous potential as acute or chronic insecticides, insect growth regulators or antifeedants against a variety of insect species (Beckage *et al.*, 1988; Jilani and Saxena, 1990; Tanzubil and McCaffery, 1990 and Shapiro *et al.* 1994). Such antifeedants and /or growth regulators may be correlated with the magnitude of biochemical changes in the test species.