



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





شبكة المعلومات الجامعية



# شبكة المعلومات الجامعية

## التوثيق الالكتروني والميكرو فيلم

# جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
علي هذه الأفلام قد اعدت دون أية 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 %



شبكة المعلومات الجامعية



# بعض الوثائق الأصلية تالفة



شبكة المعلومات الجامعية



بالرسالة صفحات  
لم ترد بالأصل

**Biological And Ecological Studies  
On The Pests Infesting Mungbean  
and Their Control by Plant Products**

**By**

**Magdy Hassan Abbass**

**National Research Centre**

**A Thesis Submitted in partial fulfillment**

**of the requirement for the degree of**

**Doctor of Philosophy (Ph.D.)**

**Department of Entomology**

**Faculty of Science**

**Cairo University**

**2000**

B

1-193

## Approval Sheet

### Title of the Thesis

**Biological and Ecological Studies  
On the Pests Infesting Mungbean  
and their Control By Plant Products**

### Name of Candidate

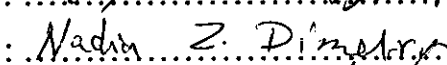
**Magdy Hassan Abbass  
National Research Centre**

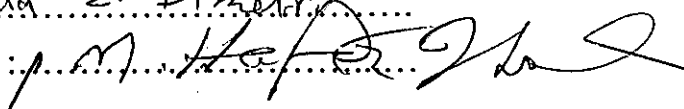
### Submitted to

**Faculty of Science, Cairo University**

### Sup. Committee:

Prof. Dr. Mahmoud Hafez Ibrahim : ..... 

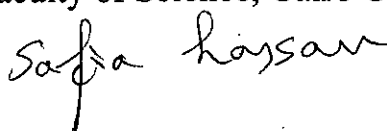
Prof. Dr. Nadia Zikry Dimetry : ..... 

Ass. Prof. Mohamed Abdel-Salam Erakey : ..... 

Prof. Dr. Safia Hassan Ahmed

Head of the Department of Entomology

Faculty of Science, Cairo University



**Biological and Ecological Studies  
On The Pests Infesting Mungbeans  
and Their Control by Plant Products**

**By**

**Magdy Hassan Abbass**

**National Research Centre**

**A Thesis Submitted for the degree of  
Doctor of Philosophy (Ph.D.)**

**List of Supervisors:**

**Prof. Dr. M.H.Ibrahim  
Prof. of Entomology  
Faculty of science,  
Cairo University.**

**Prof. Dr. N.Z. Dimetry  
Prof. Of Entomology  
National Research Centre**

**Ass. Prof. M.A. Erakey  
Department of Entomology  
Faculty of Science,  
Cairo University**

**Department of Entomology,**

**Faculty of Science,**

**Cairo University**

**2000**



## **Acknowledgement**

### **Firstly Ultimate Thanks To God**

The author wishes to express his profound gratitude, greatest appreciation and sincere thanks to Professor Dr. **Mahmoud Hafez**, Professor of Entomology, Department of Entomology, Faculty of Science, Cairo University and Professor Dr. **Nadia Z. Dimetry**, Professor of Entomology, Department of Pests and Plant Protection, National Research Centre for suggesting the problem and for their valuable supervision, painstaking criticism and in revising the manuscript.

The writer is deeply grateful to Professor Dr. **Soad El-Genguihi** Professor of Medicinal and Aromatic plants, Department of Medicinal and Aromatic plants, National Research Centre for her great help, advice and guidance in extraction, fractionation and isolation of plant extracts.

The author expresses his deepest appreciation and gratitude for late Dr. **Mohamed Abdul Salam Erakey**, Associate Professor of Entomology, Department of Entomology, Faculty of Science, Cairo University.

The author is grateful to the National Research Centre for giving all the facilities to carry out this piece of work.

# CONTENTS

|                                                                                                                              | Page |
|------------------------------------------------------------------------------------------------------------------------------|------|
| Introduction .....                                                                                                           | 1    |
| Review of literature .....                                                                                                   | 3    |
| Materials and Methods .....                                                                                                  | 52   |
| Results .....                                                                                                                | 70   |
| Part-1-                                                                                                                      |      |
| Pests infesting mungbean crop in the field .....                                                                             | 70   |
| 1-Ecological studies .....                                                                                                   | 70   |
| 1-A- Surveying the insect pests infesting mungbean<br>(1994-1995) .....                                                      | 70   |
| a- key pests .....                                                                                                           | 70   |
| b- The secondary pests .....                                                                                                 | 70   |
| c- The visitor pests .....                                                                                                   | 76   |
| d- Predators and parasitoids .....                                                                                           | 76   |
| 1-B-Population densities of insect on mungbean .....                                                                         | 76   |
| <i>Empoasca discipens</i> Poali .....                                                                                        | 76   |
| - <i>Nezara viridula</i> L. ....                                                                                             | 80   |
| - <i>Lampides boeticus</i> L. ....                                                                                           | 88   |
| - <i>Etiella zinckenella</i> Treitschke. ....                                                                                | 93   |
| 1-C-Effect of sowing dates on population fluctuations .....                                                                  | 98   |
| - <i>Empoasca discipens</i> Poali .....                                                                                      | 98   |
| - <i>Lampides boeticus</i> L. ....                                                                                           | 100  |
| - <i>Nezara viridula</i> L. ....                                                                                             | 101  |
| - <i>Etiella zinckenella</i> Treitschke .....                                                                                | 103  |
| 1-D- Effect of Ecological factors (temperature, relative humidity and<br>wind velocity) on the population fluctuations ..... | 104  |
| - <i>Empoasca discipens</i> Poali .....                                                                                      | 104  |

|                                                                                                                                                                              | Page |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| - <i>Lampides boeticus</i> L. ....                                                                                                                                           | 107  |
| - <i>Nezara viridula</i> L. ....                                                                                                                                             | 111  |
| - <i>Etiella zinckenella</i> Treitschke. ....                                                                                                                                | 113  |
| 1-E- The departure from the equilibrium position of the major insect pests infesting mungbean in relation to the variation of sowing dates of the two cultivars tested ..... | 119  |
| - <i>Empoasca discipens</i> Poali.....                                                                                                                                       | 119  |
| - <i>Lampides boeticus</i> L. ....                                                                                                                                           | 121  |
| - <i>Nezara viridula</i> L. ....                                                                                                                                             | 121  |
| - <i>Etiella zinckenella</i> Treitschke. ....                                                                                                                                | 124  |
| 1-F- The departure from the equilibrium position of the main pests infesting mungbean in relation to cultivars tested .....                                                  | 126  |
| - <i>Empoasca discipens</i> Poali .....                                                                                                                                      | 126  |
| - <i>Lampides boeticus</i> L. ....                                                                                                                                           | 126  |
| - <i>Nezara viridula</i> L. ....                                                                                                                                             | 126  |
| - <i>Etiella zinckenella</i> Treitschke. ....                                                                                                                                | 126  |
| 2-Control measures of <i>Etiella zinckenella</i> under field conditions using different neem seed formulations or ethyl oleate oil .....                                     | 130  |
| -Evaluation of spraying mungbean crop with different neem seed formulations or ethyl oleate oil on the weight of mungbean seeds ..                                           | 135  |
| -Effect of spraying mungbean crop with different neem seed formulations or ethyl oleate oil on the number of seeds/pod .....                                                 | 135  |

|                                                                                                                                                                     | Page |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Part-2                                                                                                                                                              |      |
| Pests infesting mungbean crop in the store .....                                                                                                                    | 139  |
| 1-Effect of mungbean seeds treatment with two Meliaceae leaf<br>powders and Neem Azal-W on different biological aspects of<br><i>Callosobruchus maculatus</i> ..... | 139  |
| Effect on the adult stage .....                                                                                                                                     | 139  |
| A-1-Effect on longevity .....                                                                                                                                       | 139  |
| a-Using Meliaceae leaf powders .....                                                                                                                                | 139  |
| b-Using Neem Azal-W formulation powder .....                                                                                                                        | 142  |
| A-2-Effect on the oviposition periods .....                                                                                                                         | 142  |
| a-Using Meliaceae leaf powders .....                                                                                                                                | 142  |
| b-Using Neem Azal-W formulation powder .....                                                                                                                        | 142  |
| A-3- Effect on the fecundity of the <i>Callosobruchus maculatus</i><br>Females .....                                                                                | 147  |
| a-Using Meliaceae leaf powders .....                                                                                                                                | 147  |
| b-Using Neem Azal-W formulation powder .....                                                                                                                        | 147  |
| B-Latent effect on the resulting progeny .....                                                                                                                      | 152  |
| B-1- Effect on the egg stage .....                                                                                                                                  | 152  |
| a-Using Meliaceae leaf powders .....                                                                                                                                | 152  |
| b-Using Neem Azal-W formulation powder .....                                                                                                                        | 152  |
| B-2- Effect on larval and pupal stages .....                                                                                                                        | 157  |
| a-Using Meliaceae leaf powders .....                                                                                                                                | 157  |
| b-Using Neem Azal-W formulation powder .....                                                                                                                        | 160  |

|                                                                                                                                                                       | Page |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 2-OILs .....                                                                                                                                                          | 166  |
| 2-A- The insecticidal activity of two vegetable oils on<br><i>Callosobruchus maculatus</i> adults .....                                                               | 166  |
| 2-B-Biological efficacy of vegetable oils against <i>C. maculatus</i> ...                                                                                             | 166  |
| 2-B-1- On the adult stage .....                                                                                                                                       | 166  |
| Effect on longevities .....                                                                                                                                           | 166  |
| effect of seed with two oils on the oviposition periods of<br><i>C. maculatus</i> adult females .....                                                                 | 170  |
| -Effect on the preoviposition period .....                                                                                                                            | 170  |
| -Effect on the oviposition period .....                                                                                                                               | 170  |
| -Effect on the postoviposition period .....                                                                                                                           | 170  |
| c- Effect on the female fecundity .....                                                                                                                               | 173  |
| 2-B-2- Latent effect on the resulting progeny .....                                                                                                                   | 173  |
| a- Effect on egg stage .....                                                                                                                                          | 173  |
| b- Effect on larval and pupal stages .....                                                                                                                            | 177  |
| 2-C- Behavioural effect .....                                                                                                                                         | 181  |
| 3- Plant Extract .....                                                                                                                                                | 184  |
| 3-A- Insecticidal activity .....                                                                                                                                      | 184  |
| 3-A-1- Insecticidal activity of different successive extracts using<br>different organic solvents against <i>Callosobruchus</i><br><i>maculatus</i> adults .....      | 184  |
| 3-A-2- Insecticidal activity of different petroleum ether<br>fractions, saponified and unsaponified from different<br>plants against <i>C. maculatus</i> adults ..... | 187  |

|                                                                                                                                                                              | Page |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 3-A-3- Insecticidal activity of different compounds isolated from<br><i>Citrullus colocynthis</i> and <i>Nicandra physaloids</i> against<br><i>C. maculatus</i> adults ..... | 191  |
| Compounds isolated from Chloroform extract of<br><i>Citrullus colocynthis</i> .....                                                                                          | 191  |
| Compounds isolated from Alcohol extract of<br><i>Citrullus colocynthis</i> .....                                                                                             | 191  |
| Compounds isolated from petroleum ether extract of<br><i>Nicandra physaloids</i> .....                                                                                       | 194  |
| 3-B- Biological activity of different plant extracts on <i>C.</i><br><i>maculatus</i> adults .....                                                                           | 194  |
| 3-B-1- Using <i>Citrullus colocynthis</i> crude extract and their<br>isolates on <i>C. maculatus</i> .....                                                                   | 195  |
| a- Effect on the adult stage .....                                                                                                                                           | 195  |
| Effect on the adult longevity .....                                                                                                                                          | 195  |
| Effect on the oviposition periods .....                                                                                                                                      | 195  |
| - Effect on the preoviposition period .....                                                                                                                                  | 195  |
| - Effect on the oviposition period .....                                                                                                                                     | 198  |
| - Effect on the postoviposition period.....                                                                                                                                  | 198  |
| Effect on the female fecundity .....                                                                                                                                         | 200  |
| b-Latent effect on the resulting progeny .....                                                                                                                               | 200  |
| i- Effect on the egg stage .....                                                                                                                                             | 200  |
| ii- Effect on the larval and pupal stages .....                                                                                                                              | 206  |
| 3-B-2- Using of <i>Nicandra physaloids</i> crude extract and its<br>isolated compounds on <i>Callosobruchus maculatus</i> ..                                                 | 211  |

|                                                                                                                        | Page |
|------------------------------------------------------------------------------------------------------------------------|------|
| Effect on the adult stage .....                                                                                        | 211  |
| Effect on the longevity .....                                                                                          | 211  |
| ii- Effect on the oviposition periods .....                                                                            | 211  |
| - Effect on the preoviposition period .....                                                                            | 211  |
| -Effect on the oviposition period .....                                                                                | 211  |
| -Effect on the postoviposition period .....                                                                            | 214  |
| iii- Effect on females fecundity .....                                                                                 | 214  |
| b- Latent effect on the resulting progeny .....                                                                        | 214  |
| i-Effect on the egg stage .....                                                                                        | 214  |
| ii-Effect on larval and pupal stages .....                                                                             | 219  |
| 3-C-Behavioural studies .....                                                                                          | 223  |
| -Phytochemical studies of plants having insecticidal activities .....                                                  | 228  |
| 1-Citrullus .....                                                                                                      | 228  |
| 2-Nicandra .....                                                                                                       | 228  |
| 4- Neem seed formulations .....                                                                                        | 231  |
| 4-A- The insecticidal activity of some neem seed extract<br>formulations against <i>Callosobruchus maculatus</i> ..... | 231  |
| 4-B-Biological efficiency of some neem seed extract<br>formulations against <i>Callosobruchus maculatus</i> .....      | 231  |
| a- Effect on the adult stage .....                                                                                     | 231  |
| Effect on longevity .....                                                                                              | 231  |
| Effect on the oviposition periods .....                                                                                | 234  |
| - Effect on the preoviposition period .....                                                                            | 234  |
| - Effect on the oviposition period .....                                                                               | 234  |
| - Effect on the postoviposition period .....                                                                           | 234  |