THE INSECTICIDAL POTENTIAL AND BIOEFFICACY OF SELECTED ESSENTIAL OILS AND MEDICINAL PLANT EXTRACTS ON THE PEACH FRUIT FLY, *Bactrocera zonata* (Saunders)

THESIS
Submitted for Partial Fulfillment of the Requirements for the Degree of
Ph.D.
by

MAI KAMAL KAMAL ALI DAIF

Under the supervision of

Prof. Dr.
Naeem Mohamed Eesa
Professor of Insecticides and Insect Control
Faculty of Science - Cairo University

Prof. Dr.
Hanaa Ahmed El-Sherif
Professor of Biological Control
Faculty of Science - Cairo University

Prof. Dr.
Ahmed Mahmoud Zaki Mosallam
Plant Protection Research Institute
Agricultural Research Center

Dr.
Dina Housam Abd El-Monem
Entomology Department
Faculty of Science - Cairo University

ENTOMOLOGY DEPARTMENT

FACULTY OF SCIENCE

CAIRO UNIVERSITY

(2020)

ABSTRACT

Student Name: MAI KAMAL KAMAL ALI DAIF

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Degree: Ph.D. in Insect Control

The Peach Fruit Fly (PFF), *Bactrocera zonata* (Saunders) (Diptera, Tephritidae) is a serious pest of fruits in Egypt. The public demand for insecticide-free fresh fruits encourages the use of friendly environmental biopesticides for pest control. Thus, for agricultural pest management, botanical insecticides are best suited. The objectives of the present study aims at exploring the effectiveness of certain botanical insecticides on certain biological and biochemical parameters of the peach fruit fly. The selected botanical insecticides were crude extracts (CEs) and essential oils (EOs) of *Eucalyptus*, Jojoba, Lavender and Neem.

The insecticidal potential and the morphogenetic action of the selected plants were expressed by the mean effective concentrations (EC_{50} values). Based on EC_{50} values, EOs were more effective than CEs against 3rd instar larvae as well as 1- and 3-day old pupae of the PFF. The increment of concentrations, the increase of effectiveness, where the dead individuals, malformed individuals and degree of deformities gradually and sharply increased with the increase of concentrations of all used formulations. As to the effects of the selected botanical insecticides on certain biological parameters of the fruit fly, EOs were more effective than CEs. Neem CE was the most potent showing the lowest average of emerged adults of *B. zonata*. Both CEs and EOs of the tested botanical insecticides, except EOs of Jojoba and Neem, significantly inhibited AChE in treated larvae and pupae. Jojoba and Neem, however increased the amount of AChE. The highest amounts of α-esterases and β-esterases, showed the same trend, were recorded in both larvae and pupae treated with CE of Neem and larvae treated with EO of Neem. CEs and EOs of *Eucalyptus*, Jojoba and Lavender increased chitinase amounts in the treated individuals. Neem, however, showed different trend that the decrement in chitinase amounts were the lowest.

The highest amounts of proteases in case of treated larvae and pupae were recorded with CE and EO of Jojoba. CEs of the four tested botanical insecticides as well as EO of Neem differently increased total carbohydrates in treated larvae, whereas the reverse was true in case of pupae. CEs of the four tested botanical insecticides highly reduced the amounts of total lipids in treated larvae. The amounts of total proteins were slightly lower in *B. zonata* pupae than those of full frown larvae treated with CEs of *Eucalyptus*, Jojoba and Lavender as well as EOs of Lavender and Neem. The results of the present study indicate that the selected botanical insecticides might possess potential goal for fruit fly control.

***Key words*:** Peach fruit fly, *B. zonata*, medicinal and aromatic plants, essential oils, crude plant extracts, Lavender, Jojoba, *Eucalyptus*, Neem.

1- **Prof. Dr. Naeem Mohamed Eesa**
2- **Prof. Dr. Hanaa Ahmed El-Sherif**
3- **Prof. Dr. Ahmed Mahmoud Zaki Mosallam**
4- **Dr. Dina Housam Abd El-Monem**

Prof. Dr. Ali Ahmed Younis
Chairman of Entomology Department
Faculty of Science-Cairo University

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