BIOCHEMICAL AND MOLECULAR CHANGES INDUCED BY INSECT GROWTH REGULATORS (IGRS) ON SOLITARY AND GREGARIOUS PHASES OF THE DESERT LOCUST, *SCHISTOCERCA GREGARIA* (ORTHOPTERA: ACRIDIDAE)

A Thesis submitted to the Department of Entomology, Faculty of Science, Ain Shams University for the award of the Ph.D. Degree of Science in Entomology

By

Eman Kamel Mohamed Mohamed Khalfallah

M.Sc. Entomology-Faculty of Science-Ain Shams University

Supervisors

Prof Dr. Nadia Helmy Ahmed

Emeritus Professor of Entomology-Entomology Department-Faculty of Science-Ain Shams University

Prof Dr. Nagi Sabet Badawy

Emeritus Professor of Biochemistry-Locust and Grasshopper Research Section-Plant Protection Research Institute-Agriculture Research Center

Prof Dr. Noha Awny Guneidy

Professor of Toxicology-Entomology Department-Faculty of Science-Ain Shams University

Prof Dr. Amany Soliman Khaled

Professor of Insect Control-Entomology Department-Faculty of Science-Ain Shams University

Dr. Ola Helmy Mohamed Zyaan

Lecturer in Entomology-Entomology Department-Faculty of Science-Ain Shams University

(2018)

Biography

Name: Eman Kamel Mohamed Mohamed Khalfallah

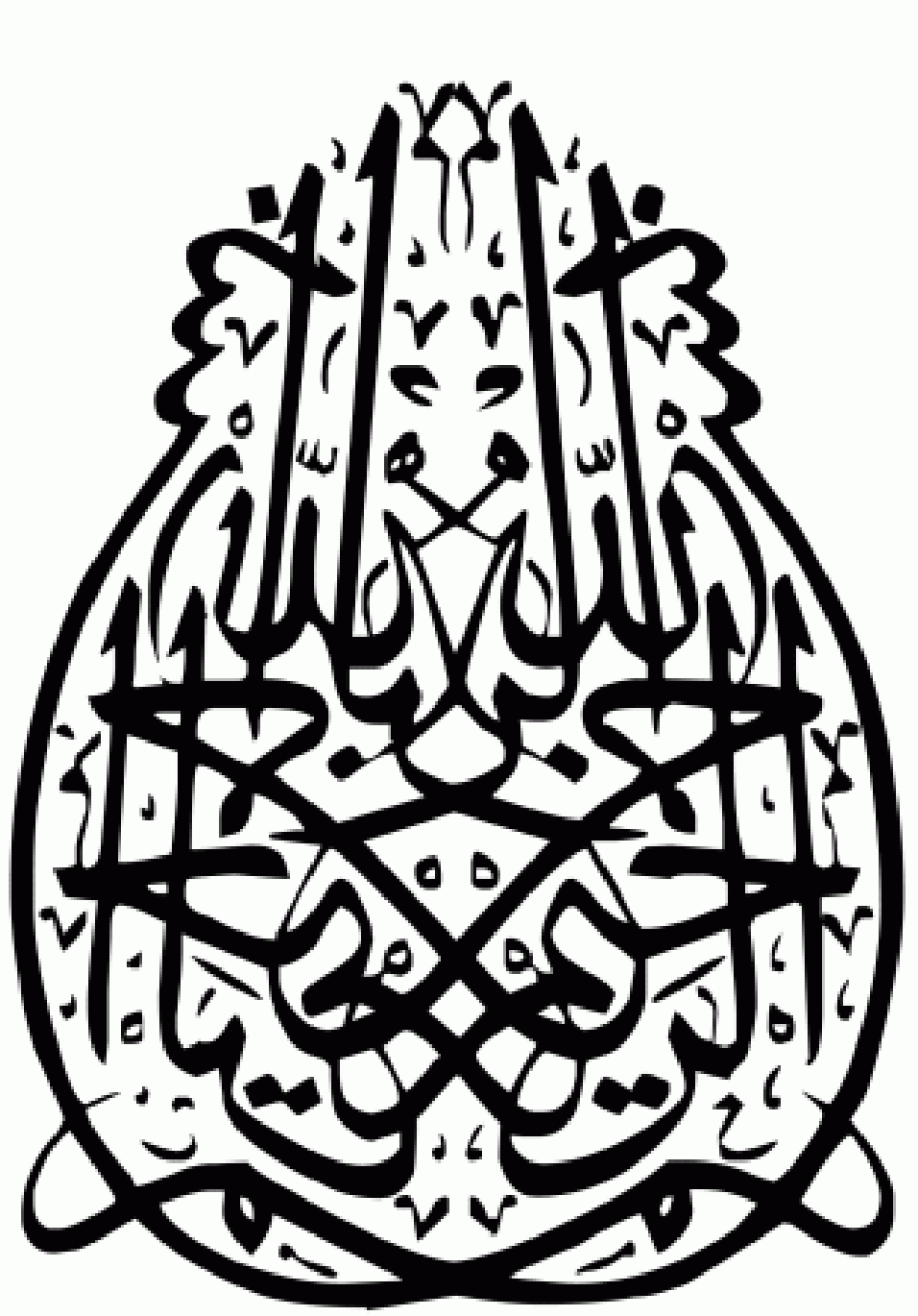
Qualification: M.Sc. Science (Entomology), 2007.

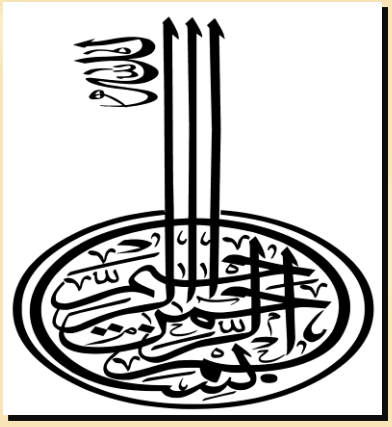
Entomology Department.

Faculty of Science.

Ain Shams University.

Present Occupation: Assistant lecturer- Locust and Grasshopper Research Section-Plant Protection Research Institute-Agriculture Research Center





الرحمن(١) علم القران(٢)

خلق الانسان(٣)علمه البيان

الشمس و القمر بحسبان(٥)

والنجم و الشجر يسجدان(٦)

سورة الرحمن

Thesis Examination Committee

Name	Title	Signature
Prof Dr. Saadya Mohamed EL-bermawy	Professor of Physiology of Entomology-Biology and Geology Department-Faculty of Education -Ain Shams University	
Prof Dr. Elham Mohamed Salama	Professor of Entomology-Entomology Department-Faculty of Science-Banha University	
Prof Dr. Nadia Helmy Ahmed	Emeritus Professor of Entomology-Entomology Department-Faculty of Science-Ain Shams University	
Prof Dr. Noha Awny Guneidy	Professor of Toxicology-Entomology Department-Faculty of Science-Ain Shams University	

Board of Supervision

Prof Dr. Nadia Helmy Ahmed

Emeritus Professor of Entomology-Entomology Department-Faculty of Science-Ain Shams University

Prof Dr. Nagi Sabet Badawy

Emeritus Professor of Biochemistry-Locust and Grasshopper Research Section-Plant Protection Research Institute-Agriculture Research Center

Prof Dr. Noha Awny Guneidy

Professor of Toxicology-Entomology Department-Faculty of Science-Ain Shams University

Prof Dr. Amany Soliman Khaled

Professor of Insect Control-Entomology Department-Faculty of Science-Ain Shams University

Dr. Ola Helmy Mohamed Zyaan

Lecturer in Entomology-Entomology Department-Faculty of Science-Ain Shams University

Approval sheet

(Ph.D. Thesis)

Name: Eman Kamel Mohamed Mohamed Khalfallah

Title: BIOCHEMICAL AND MOLECULAR CHANGES INDUCED BY INSECT GROWTH REGULATORS (IGRS) ON SOLITARY AND GREGARIOUS PHASES OF THE DESERT LOCUST, *SCHISTOCERCA GREGARIA* (ORTHOPTERA: ACRIDIDAE).

Supervisions committee:

Prof Dr. Nadia Helmy Ahmed

Emeritus Professor of Entomology-Entomology Department-Faculty of Science-Ain Shams University

Prof Dr. Nagi Sabet Badawy

Emeritus Professor of Biochemistry-Locust and Grasshopper Research Section-Plant Protection Research Institute-Agriculture Research Center

Prof Dr. Noha Awny Guneidy

Professor of Toxicology-Entomology Department-Faculty of Science-Ain Shams University

Prof Dr. Amany Soliman Khaled

Professor of Insect Control-Entomology Department-Faculty of Science-Ain Shams University

Dr. Ola Helmy Mohamed Zyaan

Lecturer in Entomology-Entomology Department-Faculty of Science-Ain Shams University

Examination committee:

Prof Dr. Saadya Mohamed EL-bermawy

Professor of Physiology of Entomology-Biology and Geology Department-Faculty of Education - Ain Shams University

Prof Dr. Elham Mohamed Salama

Professor of Entomology-Entomology Department-Faculty of Science-Banha University

Prof Dr. Nadia Helmy Ahmed

Emeritus Professor of Entomology-Entomology Department-Faculty of Science-Ain Shams University

Prof Dr. Noha Awny Guneidy

Professor of Toxicology-Entomology Department-Faculty of Science-Ain Shams University

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ABSTRACT

Application of both diflubenzuron and pyriproxyfen induced highly significant influences in some biological aspects of solitarious and gregarious *Schistocerca gregaria*, pretreated as 3rd nymphs. Total inhibition of adult emergence of diflubenzuron was 89.5%, and 100%, respectively, with gregarious and solitarious. Likewise, pyriproxyfen induced total inhibition 82.2%, and 93.5%, respectively, with gregarious and solitarious. Also, effects of these IGRs on the phase polymorphism of *S. gregaria* were displayed. Data revealed that both the previous IGRs were able to enhance the solitarization of *S. gregaria*, especially in some biological aspects. This effect was highly significant in pyriproxyfen with gregarious *S. gregaria*. However, they were unable to enhance the green pigmentation, while they induced the darkening pattern.

Some biological aspects and pigmentation of two extreme phases of *S. gregaria* were studied under variation of rearing density. Data revealed that the isolation condition induced a highly significant prolongation effect of their biological aspects and vice versa. Black patches' appearance/disappearance were the marker to the lifestyle of phase.

Furthermore, this study displayed Solitarious- Gregarious-Phase-Interchange (SGPI) as the modern controlling agent of *S. gregaria*, where this phenomenon was related to gene control. Consequently, quantitative and qualitative biochemical and molecular analysis were carried out on two extreme phases and the transient generations in between. Hence, the obtained data showed that low rearing population density induced a significant reduction of total protein and DNA levels. Quantitative differences were also detected in protein and DNA profile.

Key Words: *Schistocerca gregaria,* IGRs, diflubenzuron, pyriproxyfen, phase change, protein, DNA.

TABLE OF CONTENTS

LIST OF TABLES