

IDENTIFICATION OF INSECTS SUCCESSIVE WAVES ON CARRIONS OF POISONED **RABBITS AND GUINEA PIGS** IN RELATION TO SEASONAL VARIATIONS IN CAIRO, EGYPT

A Thesis

Presented to the faculty of Science Ain-Shams University In Partial Fulfillment for the award of the M.Sc. Degree (Entomology)

By Reham Ahmed Hamdy Abo El-Ela

B. Sc. (Entomology) 2008

Supervisors

Prof. Dr. Hayam El Hamouly Abd El Rahman

Professor of Insect Taxonomy, Entomology Department, Faculty of Science, Ain Shams University

Dr. Rabab Fathi Sawaby

Assistant Professor of Insect Taxonomy, Entomology Department, Faculty of Science, Ain Shams University

Dr. Marah Mohammad Hassan Abd El-bar

Assistant Professor, Entomology Department, Faculty of Science, Ain Shams University

> **Entomology Department Faculty of Science Ain Shams University** 2016



Biography

Name: Reham Ahmed Hamdy Abo El-Ela

Degree Awarded: B.Sc. (Entomology), 2008

Department: Entomology

Faculty: Science

University: Ain-Shams University

Date of Graduation: June 2008

Occupation: Demonstrator / Entomology Department

Faculty of Science, Ain Shams University.

Date of Appointment: November 2010

Date of Registration for M.Sc. Award: 4/4/2012

Courses studied by the candidate in partial fulfillment of the requirements for the (M.Sc.) degree:

- 1) Population Genetics and Evolution.
- 2) Natural Communities of Insects.
- 3) Molecular Biology.
- 4) Insects Biochemistry.
- 5) Pollution of the Environment.
- 6) Medical and veterinary Entomology.
- 7) Insect Transmission to the Plant Diseases.
- 8) Insect Microbiology.
- 9) Immunology and Parasitology.

SUPERVISORS

Prof. Dr. Hayam El Hamouly Abd El Rahman:

Professor of Insect Taxonomy, Entomology Department, Faculty of Science, Ain-Shams University.

Dr. Rabab Fathi M. Sawaby:

Assistant Professor of Insect Taxonomy, Entomology Department, Faculty of Science, Ain-Shams University.

Dr. Marah Mohammad Hassan Abd El-bar:

Assistant Professor of Entomology, Entomology Department, Faculty of Science, Ain-Shams University.

Acknowledgment

Thanks first and last to Allah for the utmost help and support during this work.

I would never have successfully completed this thesis without the assistance of numerous people to whom I am indebted.

First of all, I would like to gratefully acknowledge my supervisor *rof. Dr. Hayam El Hamouly Abd El Rahman*, Professor of Insect*P* axonomy, Ain Shams University who assigned the work, generallyT ffered her time, expertise, wisdom and continuous encouragement ino uiding me and mentoring me step by step through the whole researchg rocess. Without her advices, this thesis would not have come intop .being

I am greatly indebted to *Dr. Rabab Fathi Sawaby*, Assistant Professor of Entomology, Ain Shams University for her supervision, kind encouragement and valuable advice.

Also, I wish to thank *Dr. Marah Mohammad Abd El-bar*, Assistant Professor of Entomology, Ain Shams University; for her supervision and guidance.

I wish to express my greatest gratitude and thanks to *Prof. Dr.*Salwa Kamal Mohammad (God rest her soul) for her kind help.

Thanks are also to *Prof. Dr. Hassan H. Fadl* Professor of Insect Taxonomy, Ain Shams University and *Dr. HaithumBadrawy* Assistant

Professor of Entomology, Ain Shams University for the various help they offered me during this work.

Thanks are due to the staff members of Ain Shams University Collection (ASUC) and colleagues for the help they offered me throughout this study.

Thanks are also to *Prof. Dr. Adel Kamal*, the head of Entomology Department, Faculty of Science, Ain Shams University. My thanks also passed to the staff members and colleagues of the department for encouraging me throughout this study.

My grateful acknowledgments are passed to the staff members of Entomology Department, Faculty of Science, Cairo University; the staff members of Faculty of Agriculture, Al Azhar University; and Ministry of Agriculture, Identification section for their kind helps.

Deepest thanks for my lovely friends who kindly encourage me and give me support during critical times.

And of course, my warmest thanks to my family for all their love, support and liberality. My parents without you, so many things would not have been possible, and my sweet sister *Heba*, thanks for your help and your great effort. Lastly, thanks to my dear husband, Eng. *Atef Badr*, for his continued and unfailing love, support and understanding that fostered my diligence in my career and made the completion of this thesis possible.

List of Figures

Fig. (1): Location of the study site	67
Fig. (2): The study area and the experimental cages	67
Fig. (3): Weather history & observation graph during	68
winter season from 2 nd Jan. to 6 th April 2012.	
Fig. (4): Weather history & observation graph during	69
summer season from 14 th Jul. to 30 th Jul. 2012	
Fig. (5): Molecular structure of tramadol.	61
Fig. (6): Fresh stage of rabbit carcass decomposition.	78
Fig. (7): Fresh stage of guinea pig carcass	78
decomposition.	
Fig. (8): Bloat stage of rabbit carcass decomposition.	79
Fig. (9): Bloat stage of guinea pig carcass	79
decomposition.	
Fig. (10): Active decay stage of rabbit carcass	80
decomposition.	
Fig. (11): Active decay stage of guinea pig carcass	80
decomposition.	
Fig. (12): Cadaver decomposition island (CDI)	81
appeared at the active decay stage of	
decomposition.	
Fig. (13): Showing maggot departure beneath and	81
around carcasses for pupation.	
Fig. (14): Advanced decay stage of rabbit carcass	82
decomposition.	
Fig. (15): Advanced decay stage of guinea pig carcass	82
decomposition.	
Fig. (16): Skeletal stage of rabbit carcass	83
decomposition	
Fig. (17): Skeletal stage of guinea pig carcass	83
decomposition.	
Fig. (18): Duration of decomposition stages of control,	89
zinc phosphide and tramadol treated carcasses	
during winter season for rabbit.	
Fig. (19): Duration of decomposition stages of control,	89
zinc phosphide and tramadol treated carcasses	

1 ' C 11'	1
during summer season for rabbit.	
Fig. (20): Duration of decomposition stages of control,	
zinc phosphide and tramadol treated carcasses	90
during winter season for guinea pig.	
Fig. (21): Duration of decomposition stages of control,	
zinc phosphide and tramadol treated carcasses	90
during summer season for guinea pig.	
Fig. (22): Percentage of collected insect families (adult)	
of control rabbit carcasses during winter	95
season (2012).	
Fig. (23): Percentage of collected insect families (adult)	
of control guinea pig carcasses during winter	95
season (2012).	
Fig. (24): Percentage of collected insect families (adult)	
of zinc phosphide intoxicated rabbit carcasses	96
during winter season (2012).	
Fig. (25): Percentage of collected insect families (adult)	
of zinc phosphide intoxicated guinea pig	96
carcasses during winter season (2012).	
Fig. (26): Percentage of collected insect families (adult)	
of tramadol intoxicated rabbit carcasses	97
during winter season (2012).	
Fig. (27): Percentage of collected insect families (adult)	
of tramadol intoxicated guinea pig carcasses	97
during winter season (2012).	
Fig. (28): Percentage of collected insect families (adult)	
of control rabbit carcasses during summer	98
season(2012)	
Fig. (29): Percentage of collected insect families (adult)	
of control guinea pig carcasses during	98
summer season (2012).	
Fig. (30): Percentage of collected insect families (adult)	
of zinc phosphide intoxicated rabbit carcasses	99
during summer season (2012).	
Fig. (31): Percentage of collected insect families (adult)	
	99
of zinc phosphide intoxicated guinea pig	フラ
carcasses during summer season (2012).	

Fig. (32): Percentage of collected insect families (adult) of tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (33): Percentage of collected insect families (adult) of tramadol intoxicated guinea pig carcasses during summer season (2012). Fig. (34): Dead maggots around control rabbit carcass cage in summer season. Fig. (35): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season (2012).		
of tramadol intoxicated guinea pig carcasses during summer season (2012). Fig. (34): Dead maggots around control rabbit carcass cage in summer season. Fig. (35): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, I42 zinc phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season (2012).	during summer season (2012).	100
of tramadol intoxicated guinea pig carcasses during summer season (2012). Fig. (34): Dead maggots around control rabbit carcass cage in summer season. Fig. (35): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, I42 zinc phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season (2012).	Fig. (33): Percentage of collected insect families (adult)	
during summer season (2012). Fig. (34): Dead maggots around control rabbit carcass cage in summer season. Fig. (35): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, large phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season (2012).		100
Fig. (34): Dead maggots around control rabbit carcass cage in summer season. Fig. (35): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season (2012).		
Fig. (35): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season (2012).		
Fig. (35): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season		135
Sarcophagid and Muscid maggots of control, l42 zinc phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season lates guinea pig carcasses during summer season		ļ
zinc phosphide and tramadol intoxicated rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season 145 guinea pig carcasses during summer season 145	Fig. (35): Average numbers of collected Calliphorid,	
rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season 145 guinea pig carcasses during summer season	Sarcophagid and Muscid maggots of control,	142
rabbit carcasses during winter season (2012). Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season 145 guinea pig carcasses during summer season	zinc phosphide and tramadol intoxicated	
Fig. (36): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season		
Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season 145 guinea pig carcasses during summer season		
zinc phosphide and tramadol intoxicated rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season		
rabbit carcasses during summer season (2012). Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season	1 0	
Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season	zinc phosphide and tramadol intoxicated	143
Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season	rabbit carcasses during summer season	
Fig. (37): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season	(2012).	
Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season		
zinc phosphide and tramadol intoxicated guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season		
guinea pig carcasses during winter season (2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season		1 1 1
(2012). Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season	1 1	144
Fig. (38): Average numbers of collected Calliphorid, Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season		
Sarcophagid and Muscid maggots of control, zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season	1 ,	
zinc phosphide and tramadol intoxicated guinea pig carcasses during summer season	Fig. (38): Average numbers of collected Calliphorid,	
guinea pig carcasses during summer season	Sarcophagid and Muscid maggots of control,	
	zinc phosphide and tramadol intoxicated	145
(2012).	guinea pig carcasses during summer season	
	(2012).	