

الاية

قال تعالى:

*وَلَوْلَا إِذْ دَخَلْتَ جَنَّتَكَ قُلْتَ مَا هَاءِ اللَّهُ لَا قُوَّةَ إِلَّا بِاللَّهِ إِنَّ تَمَرِنَ أَنَا أَقَلُّ
مِنْكَ مَا لَآ وَوَلَدًا ﴿٣٩﴾ فَعَسَى رَبِّي أَن يُؤْتِيَنِي خَيْرًا مِّنْ جَنَّتِكَ وَيُرْسِلَ
عَلَيْهَا حُسْبَانًا مِّنَ السَّمَاءِ فَتُصْرِحَ صَعِيدًا زَلَقًا ﴿٤٠﴾ أَوْ يُصْرِحَ مَأْوَمًا فَعَوَّا
فَلَن تَسْتَطِيعَ لَهُ طَلَبًا ﴿٤١﴾.

سورة الكهف – الاية (٣٩-٤١)

DEDICATION

**TO MY MOTHER, FATHAR, BROTHERS, SISTER ,
WIFE AND CHILDREN.**

IDRIES.

ACKNOWLEDGEMENTS

All thanks are due to Almighty Allah (Jala-Jalalaho) who gave me health and strength and helped me tremendously to achieve this work. I am greatly indebted to my supervisor Dr. Saif EL din Mohammed Kheir for his guidance, patience and keen interest and continuous participations throughout this study.

Thanks to my M.Sc. friend's. Thanks are due to staff members of Plant Protection Department, College of Agricultural Studies.

Thanks due to Administration of Horticultural Sector (Khartoum -Mogran) for nominate me this chance to study M.Sc.

Thanks are to the Ministry of Agriculture and Animal Resource of Khartoum States specially (Administration of Agricultural Extension).

Thanks to my agricultural inspectors friends in the schemes of West Soba, South Salyate, El faki hashim and Wad ramly for facilitating the work of the experiments in the fields.

Thanks to the Shambat Research Station.

Thanks are due to Dr. Salah Daf ALLa for his kindness during statistic analysis process.

Thanks to my family who always supported me on this work, specially my wife.

Thanks are also extended to all those who gave me help for production this work.

At the first and end all thanks are due to Almighty Allah.

Content

Subject	Page
الاية.....	1
Dedication.....	II
Acknowledgements.....	III
Contents.....	IV
list of tables.....	VII
List of figures.....	VIII
List of plates.....	IX
English abstract.....	X
Arabic abstract.....	XII
CHAPTER ONE	1
INTRODUCTION.....	1
CHAPTER TWO.....	4
2-LITERATURE REVIEW.....	4
2-1-Tuta absoluta	4
2-1-1-Back ground.....	4
2-1-2-Taxonomy	4
2-1-3-Geographical and distribution	5
2-1-4-Description.....	5
2-1-5-Biology.....	6
2-1-6-Ecology.....	7
2-1-7-Behavior.....	7
2-1-8- Host plant.....	8
2-1-9-Damage and economic importance.....	8
2-1-10-Control measure	11

2-1-10-1-Cultural control	11
2-1-10-2-Biological control	12
2-1-10-3-Botanical control.....	13
2-1-10-4-Chemical control.....	13
2-1-10-5-Other control methods.....	15
2-2-Tomato.....	15
2-2-1-Taxonomay.....	16
2-2-2-Botany	16
2-2-3-Ecology.....	16
2-2-4-Nutritional value of tomato.....	17
2-3-Jatropha curcas.....	17
2-3-1-Taxonomy.....	18
2-3-2-Botanical description.....	18
2-3-3-Geographical distribution.....	18
2-3-4-Cultivation	19
2-3-5-Chemistry.....	19
2-3-6-Economic importance.....	20
2-3-7-Medical uses.....	20
CHAPTER THREE	23
3-MATERIALS AND METHODS	23
3-1-Equipments.....	28
3-2-Materials.....	28
3-3-Method of field survey experiment.....	29
3-4-Laboratory extract experiment.....	29
3-4-1-Collection of the target insect.....	29
3-4-2-Egg preservation.....	29
3-4-3-Larvae rearing.....	30

3-4-4-Pupae preservation.....	30
3-5-Collection and preparation of plant materials.....	30
3-5-1-Extraction methods.....	30
3-5-2-Preparation of concentrations.....	30
3-5-3-Bioassay procedure.....	31
3-6-Laboratory preference experiments	31
3-6-1-Collection of vegetables.....	31
3-6-2-Preference experiment.....	32
3-7-Experimental design	32
3-8-Statistical analysis.....	32
CHAPTER FOUR.....	33
RESULTS.....	33
-Field survey experiment.	
-Laboratory extract experiment.	
-Laboratory preferences experiment.	
CHAPTER FIVE	45
DISCUSSION.....	45
CONCLUSION AND RECOMMENDATIONS.....	48
REFERENCES.....	49
APPENDICES.....	58

List of tables

Table (1) Infestation of pests on summer tomato (taken from plants) durin three months in the agricultural schemes of (West Sobs, South Salyate,El faki hashim and Wad ramly) in Khartoum Stat.....35

Table (2) Infestation of pests on summer tomato in the four areas during July ,August and September in Khartoum State.....37

Table (3) Effect of seeds ethanolic extract of *Jatropha curcas* on mortality of second larval instar of Tomato leaf miner.....39

Table (4) Preferences of second larval instar of Tomato leaf miner on vegetables after five days of exposure.....41

Table (5) Preferences of second larval instar of Tomato leaf miner on vegetables after ten days of exposure.....43

List of figures

Figure (1) Infestation of pests on summer tomato (taken from plants) during three months in the agricultural schemes of (West Soba, South Salyate, El faki hashim and Wad ramly) in Khartoum State.....36

Figure (2) Infestation of pests on summer tomato in the four areas during July ,August and September in Khartoum State.....38

Figure (3) Effect of seeds ethanolic extract of *Jatropha curcas* on mortality of second larval instar of Tomato leaf miner.....40

Figure (4) Preference of second larval instar of Tomato leaf miner on vegetables after five days of exposure..... 42

Figure (5) Preference of second larval instar of Tomato leaf miner on vegetables after ten days of44

List of plates

Plate (1) Life cycle of Tomato leaf miner.....	10
Plate (2) <i>Jatropha curcas</i> L. plant.....	22
Plate (3) <i>Jatropha curcas</i> L. leaves.....	22
Plat (4) <i>Jatropha curcas</i> L.seeds.....	22
Plate (5) The map of the four agricultural schemes of (West Soba, South Slayate,El faki hashim and Wad ramly) in Khartoum State which cultivated by summer tomato.....	24
Plate (6) Field of summer tomato at (flowering stage) with a pheromone trap TUA-100N in West Soba agricultural scheme.....	25
Plate (7) Field of summer tomato at (fruits stage) in Wad ramly Agricultural Scheme.....	25
Plate (8)Types of TUA-100N pheromone traps of Tomato leaf miner.....	26
Plate(9) The experiment design of <i>Jatropha curcas</i> against <i>T.absoluta</i>	27
Plate(10) The cages of vegetables which preferences by <i>T.absoluta</i>	27

English abstract:

A survey was carried out for tomato leaf miner *Tuta absoluta* (Meyrick) (Lepidoptera:Gelechiidae) on summer tomato (GS variety) in open field of four agricultural schemes of about 40 fedans in Khartoum State. The aim of survey was to evaluate the infestation of this pest on summer tomato. The results showed that no infestation scored by *Tuta absoluta* in summer tomato in all the period of experiment, although other pests were found such as:leaf miner ,leaf curl,boll worm and mealy bug . This may be due to the unsuitable Environmental conditions to the pest during July, August and September.The recommendation to cultivate the summer tomato (GS) on these months safely.

Also there was two laboratory experiments were conducted in the Department of Plant Protection,Collage of Agricultural Studies, Sudan University of Science and Technology (SUST).The first study was to examine the lethal effect of seeds ethanolic extract of *Jatropha curcas* L,against the larvae of *Tuta absoluta*. Four concentrations were used in this experiment 5%, 10%, 15% and 20% .The result showed that all the tested concentrations caused higher mortality percentage than the control. The lowest concentration 5% gave 68% mortality after 72 hrs of exposure. The highest concentration 20% scored 100% mortality not less than the mortality percentage of the standard insecticides after 72 hrs of exposure.The recommendation can be to use this extract as a control agent for *Tuta absoluta*.

The second laboratory study was to investigate the preference of larvae of Tomato leaf miner on leaves and fruits of five vegetable plants .The results showed that there was significant difference in preferences of larvae after five days of appearance of the the larvae. .The larvae only preferred the

leaves of tomato 86.7% and potato 20% while their preference in fruits was zero. After ten days also there was significant difference in preferences of the larvae. The larvae preferred the leaves of potato 20%, tomato 13%, eggplant 10% and pepper 6.6%. On fruits the larvae only preferred tomato 33.3% and potato 3.3%. The recommendation can be avoiding cultivating other solanaceae beside tomato.

المخلص

تم اجراء مسحى عن حافرة اوراق الطماطم (*Tuta absoluta* (Meyrick) في الطماطم الصيفية للعينه (GS) في حقل مكشوف في اربعة مشاريع زراعية ل 40 فدان في ولاية الخرطوم. هدف المسح تقييم اصابة هذه الافه للطماطم الصيفية. اوضحت النتائج بانه لا توجد اصابات احرزت للطماطم الصيفية من *T. absoluta* في كل زمن التجربة بالرغم من وجود بعض الافات مثل: حافرة الاوراق، مرض التجعد، بیدان الثمار و البق الدقيقى و يعود ذلك ربما نسبة لعدم ملائمة الظروف البيئية للافه خلال الاشهر يوليو، اغسطس و سبتمبر. يوصى بزراعة الطماطم الصيفية (GS) في هذه الاشهر بامان. كذلك اجريت تجربتين في معمل قسم وقاية النبات--كلية الدراسات الزراعية-جامعة السودان للعلوم و التكنولوجيا. هدفت الدراسة الاولى عن اختبار الاثر القاتل لمستخلص ايثانول بذور نبات الجا تروفا *Jatropha curcas* ضد يرقات *T. absoluta*. استخدمت اربعة تركيزات 5%، 10%، 15% و 20%. اوضحت النتائج بان كل التركيزات المختبره اعطت نسبة موت اعلى من الشاهد. اقل تركيز 5% اعطى نسبة موت 68% وذلك بعد 72 ساعة من المعاملة. اعلى تركيز 20% اعطى نسبة موت 100% بعد 72 ساعة من المعاملة لا تقل عن نسبة موت المبيد الحشرى القياسى. التوصية يمكن استخدام هذا المستخلص في مكافحة *T. absoluta*.

الدراسة الثانية كانت لمعرفة تفضيل يرقات حافرة اوراق الطماطم لاوراق و ثمار خمسة من نباتات الخضر. اظهرت النتائج هنالك فروق معنوية مختلفة لتفضيل اليرقة بعد مضي خمسة ايام من ظهور اليرقات. اليرقات فضلت فقط اوراق الطماطم 86.7% و البطاطس 20% في حين تفضيلها للثمار كان صفرا. بعد مضي عشرة ايام ايضا هنالك فروق معنوية مختلفة لتفضيل اليرقات. اليرقات فضلت اوراق البطاطس 20%، الطماطم 13%، و البازنجان 10% و الفلفل 6.6%. في الثمار اليرقات فضلت فقط الطماطم 33.3% و البطاطس 3.3%. التوصية يجب تجنب زراعة العائلة solanaceae بجانب الطماطم.