

CONTENTS

	Page
1- INTRODUCTION	1
2- REVIEW OF LITERATURE	4
2.1 The Egyptian cotton leafworm <i>S.Littoralis</i>	4
2.2 Insect growth regulators (IGRs)	6
2.3 Toxicological and Biological Studies	10
2.4 Effect of IGRs on some enzymatic activities	28
2.4.1 Phosphatases enzyme activities	28
2.4.2 Esterases enzyme activities	30
2.5 Effect of IGRs on insects DNA	33
2.6 Bioinformatics	36
2.7 RNA secondary structure	37
2.8 Phylogenetic tree	39
3-MATERIALS AND METHODS	41
3.1 Tested insect	41
3.1.a Source of the colony	41

3.1.b - Rearing technique	41
3.2 Tested compounds	42
3.3 Biological studies	44
3.3.1 Bioassay	44
3.3.2. Aspects studied for immature stages	44
3.3.3. Aspects studied for adult stage	44
3.4 Toxicological studies	45
3.4.1. Susceptibility of cotton leafworm to IGRs	45
3.4.2. Preparation of the tested IGRs solutions	45
3.4.3. Preparation of treated leaves	45
3.4.4. Treatment technique	45
3.4.5. Control experiment	46
3.4.6. Mortality reading	46
3.5 Estimation of enzymatic activities	46
3.5.1. Preparation of samples for the assay	47
3.5.2. Determination of acid phosphatase	47
3.5.3. Determination of non-specific esterases	48
3.6 Molecular studies	49

3.6.1. Isolation of DNA	49
3.6.2. Electrophoresis of DNA in Agarose Gel	50
3.6.2.1. Gel Preparation	50
3.6.2.2. Preparation of TAE Buffer	50
3.6.2.3. Sample Preparation	50
3.6.2.4. Staining the Gel	51
3.6.3. RFLP Analysis	51
3.6.3.1. The PCR mixture per genotype	51
3.6.3.2. PCR program and temperature profile	52
3.6.3.3. Primers Used In RFLP-PCR Analysis	53
3.6.3.4. Restriction Enzymes Used In RFLP-PCR Analysis	53
3.7. Calculations and Data Analysis	54
4-RESULTS	58
4.1. Biological studies	58
4.1.1. Effect of Cascade on some biological aspects of <i>S. littoralis</i> treated as 2nd larval instar	58
4.1.2. Effect of Cascade on some biological aspects of <i>S. littoralis</i> treated as 4th larval instar	63

4.1.3. Effect of Match on some biological aspects of <i>S. littoralis</i> treated as 2nd larval instar	67
4.1.4. Effect of Match on some biological aspects of <i>S. littoralis</i> treated as 4th larval instar	71
4.1.5. Effect of Mimic on some biological aspects of <i>S. littoralis</i> treated as 2nd larval instar	75
4.1.6. Effect of Mimic on some biological aspects of <i>S. littoralis</i> treated as 4th larval instar	79
4.2. Toxicological studies and oral toxicity of the tested insect growth regulators against 2nd and 4th larval instars of <i>S. littoralis</i>	83
4.2.1 Susceptibility of 2nd larval instar	83
4.2.2 Susceptibility of 4th larval instar	83
4.3. Morphogenic abnormalities and malformation shapes	87
4.3.1. Malformed Larvae	87
4.3.2. Larval-pupal intermediates	87
4.3.3 Malformed Pupae	87
4.3.4. Malformed Adults	87

4.4. Effect of sub- lethal concentrations of the tested IGRs on some enzymatic activities	98
4.4.1. Effect of Cascade on acid phosphatase enzyme	98
4.4.2. Effect of Cascade on non-specific esterases	98
4.4.3. Effect of Match on acid phosphatase enzyme	105
4.4.4. Effect of Match on non-specific esterases	105
4.4.5. Effect of Mimic on acid phosphatase	112
4.4.6. Effect of Mimic on non-specific esterases	112
4.5. Molecular biological studies	119
4.5.1. Bioinformatics	131
4.5.2. Vira-like chitinase gene alignment	150
4.5.3. The expected protein charges	169
4.5.4. RNA secondary structure prediction	174
4.5.5. Phylogenetic Tree prediction	188
5-DISCUSSION	194
6- ENGLISH SUMMARY	206
7- REFERENCES	208
8- ARABIC SUMMARY	