

CONTENTS

	Page
ACKNOWLEDGMENT	
I. INTRODUCTION	1
II. REVIEW OF LITERATURE	3
1. Chemical control	3
2. Biological control.....	26
3. Integrated Pest Management (IPM)	44
III. MATERIALS AND METHODS	52
1. Chemical control	52
2. Biological control.....	54
A. Parasitoid collection.....	54
B. Release the parasitoid.....	55
C. Evaluation of parasitisation	55
3. Agricultural control.....	55
A. The first experiment.....	55
B. The second experiment	57
4. Natural control	57
A. Percentage of parasitism	57
B. Percentage of predation.....	58
5. Mechanical control.....	58
A. Pruning.....	58
B. Light all day	59
6. IPM programme	59
A. The first experiment.....	59
B. The second experiment	60
IV. RESULTS AND DISCUSSION	61
1. Chemical control	61
2. Biological control.....	64
2.1. Study of percentages of infestation.....	65
2.2. Effect of release of parasitoid on the numbers of larvae and pupae.....	68
2.3. Study of percentages of parasitism	69
3. Agricultural control.....	72
3.1. The first experiment.....	73
3.1.1. Study of the percentages of infestation.....	73
3.1.2. Effect of fertilization on numbers of larvae and pupae	75
3.2. The second Experiment	79
3.2.1. Study the percentages of infestation.....	79
3.2.2. Effect of nitrogen and potassium fertilization on the mean numbers of larvae and pupae of <i>P. citrella</i> in Navel orange trees	82
4. Study of natural control.....	86
4.1. The first season.....	86
4.1.1. Percentages of parasitism	86

4.1.2. Study of percentages of predation	87
4.2. The second season	90
4.2.1. Study of the percentages of parasitism	90
4.2.2. Study of the predation rate	91
5. Using mechanical control.....	95
5.1. The pruning.....	95
5.1.1. The first season.....	95
5.1.1.1. Study of the percentages of infestation	95
5.1.1.2. Study of larvae and pupae	96
5.1.2. The second season	99
5.1.2.1. Study of percentages of infestation	99
5.1.2.2. Study of the total numbers of larvae and pupae	102
5.2. Effect of light all day	103
5.2.1. Study of the percentages of infestation.....	103
5.2.2. Study of the total numbers of larvae and pupae	106
6. IPM programme	107
A. Study the percentages of infestation	107
B. Study of larvae and pupae population.....	108
V. SUMMARY AND CONCLUSIONS.....	113
VI. REFERENCES.....	123
ARABIC SUMMARY	

LIST OF TABLES

No.	Title	Page
Table (1)	Effect of some insecticides on larvae and pupae of CLM on Sour orange trees at Qalubia Governorate during June-July, 2003.....	63
Table (2)	Effect of release <i>Cirrospilus quadristriatus</i> parasitoids on the population fluctuation and percentages of infestation of CLM in Sour orange trees at Qalubia Governorate.....	66
Table (3)	Effect of release <i>C. quadristriatus</i> on the percentage of parasitism on citrus leaf miner <i>P. citrella</i> Stainton in Sour orange trees at Qalubia Governorate during the period from the 11 th September 2003 to the 4 th December 2003.....	70
Table (4)	Effect of both nitrogen and potassium fertilizers on the percentages of infestation of <i>P. citrella</i> in Navel orange trees at Qalubia Governorate during the first season 2002-2003.....	77
Table (5)	Effect of both nitrogen and potassium fertilization on the mean numbers of larvae and pupae of <i>P. citrella</i> in Navel orange trees at Qalubia Governorate during the first season 2002-2003.....	78
Table (6)	Effect of mixed nitrogen and potassium fertilization on the percentages of infestation of <i>P. citrella</i> in Navel orange trees at Qalubia Governorate during the first season 2002-2003.....	84
Table (7)	Effect of mixed nitrogen and potassium fertilization on the mean numbers of larvae and pupae of <i>P. citrella</i> in Navel orange trees at Qalubia Governorate during the second season 2003-2004.....	85
Table (8)	Effect of natural control on the percentages of <i>P. citrella</i> along one season (2002-2003) in citrus orchards at Qalubia Governorate.....	88
Table (9)	Effect of natural control on the percentages of parasitism and percentages of predation of <i>P. citrella</i> along one season (2003-2004) in citrus orchards at Qalubia Governorate.....	93
Table (10)	Effect of pruning of Navel orange tree on the percentages of infestation with CLM and population density of larvae and pupae during (2002-2003) season at Qalubia Governorate.....	97
Table (11)	Effect of pruning on the citrus leaf miner population along one year (2003-2004) in Navel orange trees at Qalubia Governorate.	100
Table (12)	Effect of light all-day on the citrus leaf miner population along one year (2003-2004) on Sour orange seedlings.....	104
Table (13)	Effect of using IPM programme on the citrus leaf miner population in Sour orange trees at Qalubia Governorate.....	111

LIST OF FIGURES

No.	Title	Page
Fig. (1)	Citrus leaves infested with citrus leaf miner <i>P. citrella</i> Stainton.....	53
Fig. (2)	Different stages of citrus leaf miner <i>P. citrella</i> Stainton.....	53
Fig. (3)	Materials used to collection the parasitoid <i>C. quadristriatus</i>	56
Fig. (4)	The parasitoid <i>C. quadristriatus</i>	56
Fig. (5)	Effect of release <i>Cirrospilus quadristriatus</i> parasitoids on the population fluctuation of CLM and percentages of infestation in Sour orange trees at Qalubia Governorate.....	67
Fig. (6)	Effect of release <i>C. quadristriatus</i> parasitoids on the percentage of parasitism of citrus leaf miner <i>P. citrella</i> Stainton in Sour orange trees at Qalubia Governorate	71
Fig. (7)	Effect of natural control on the percentage of predation of <i>P. citrella</i> along one year (2002-2003) in citrus orchards at Qalubia Governorate.....	89
Fig. (8)	Effect of natural control on the percentage of parasitism and percentages of predation of <i>P. citrella</i> along one year (2003-2004) in citrus orchards at Qalubia Governorate.....	94
Fig. (9)	Effect of pruning on the percentages of infestation with CLM and population density of larvae and pupae during (2002-2003) season at Qalubia Governorate.....	98
Fig. (10)	Effect of pruning of Navel orange trees on the percentages of infestation with CLM and population density of larvae and pupae during (2003-2004) season at Qalubia Governorate.....	101
Fig. (11)	Effect of light all-day on the citrus leaf miner population along one year (2003-2004) on Sour orange seedlings.....	105
Fig. (12)	Effect of using IPM programme on the citrus leaf miner population in Sour orange trees at Qalubia Governorate.....	112