

DEDICATION

**To the soul of my Mother With
deep love**

And for

My Family

**Father, Brothers, Husband,
Teachers and Friends**

With love

Ashwag

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Contents

	.Page No
Dedication	i
Acknowledgement	ii
Contents	iii
List of Tables	viii
List of Figures	x
Abstract	xiii
Arabic Abstract	xvi
CHAPTER ONE: Introduction	1
CHAPTER TWO:Review of Literature	4
2.1 Botanical insecticides	4
2.2 Intercropping	5
2.2.1 Types of intercropping practices	5
2.2.2 Advantages	5
2.3 Tomato	6
2.3.1 Scientific Classification	7
2.3.2 Common name in different languages	7
2.3.3 Description	7
2.3.4 Distribution	8
2.3.5 Importance of tomato	10
2.3.6 Nutrient value of tomato	10
2.3.7 Medical uses of tomato	11
2.3.8 Toxicity of tomato	11
2.3.9 Classification of tomato cultivars	11
2.3.10 Type of tomato in the Sudan	13
2.3.11 Climatic requirements and Agriculture practices	13
2.3.11.1 Temperature	13
2.3.11.2 Soil	14
2.3.11.3 Irrigation	16
2.3.11.4 Fertilizer	17
2.3.12 Culture and care	19
2.3.12.1 Pruning	19
2.3.12.2 Stacking	19
2.3.12.3 Caging	19
2.3.12.4 Plastic mulches	19
2.3.12.5 Organic mulches	20
2.3.13 Harvest, Storage, market and market:	20
2.3.14 Greenhouse tomato production	22
2.3.15 Common growing problems and solution	23
2.3.15.1 Physiological disorders	23
2.3.15.2 Blossom-end rot	23
2.3.15.3 Blossom drop	24
2.3.15.4 Fruit cracking	24
2.3.15.5 Catface and Blossom scar	24
2.3.15.6 Puffiness	24
2.3.15.7 Blotchy ripening	25

	.Page No	
2.3.15.8	Yellow top	25
2.3.15.9	Large Core, Green Gel	25
2.3.15.10	Sun burn or sunscald	25
2.3.16	Tomato Diseases	25
2.3.16.1	Fusarium wilt	26
2.3.16.2	Verticillum wilt	26
2.3.16.3	Bacterial wilt	26
2.3.16.4	Bacterial canker	26
2.3.16.5	Bacterial speck	27
2.3.16.6	Bacterial spots	27
2.3.16.7	Early blights	27
2.3.16.8	Anthracnose	27
2.3.16.9	Powdery mildew	28
2.3.17	Viruses diseases	28
2.3.18	Nematodes	28
2.3.19	Tomato Insect pests	29
2.3.20	Weeds	29
2.4	Actara®25WG (Neonicotinoid)	30
2.4.1	Active ingredient	30
2.4.2	Insecticidal activity	30
2.4.3	Mode of action	31
2.5	Argel <i>Solenostemma argel</i> (Del)	32
2.5.1	Scientific Classification	32
2.5.2	Description	32
2.5.3	Distribution	33
2.5	Medicinal value	33
2.5.5	Insecticides activity of argel	35
2.5.6	Chemical constituents of argel	37
2.6	Garad or sunt <i>Acacia nilotica</i> (L)	37
2.6.1	Scientific classification	37
2.6.2	Description	38
2.6.3	Distribution	39
2.6.4	Habitation	39
2.6	Economic Important	40
2.6.6	Medical uses	42
2.6.7	Chemical consistent	42
2.6.8	Insecticides activity	44
2.7	Cafur Eucalyptus <i>camaldulensis</i>	45
2.7.1	Scientific classification	45
2.7.2	Description	45
2.7.3	Distribution	46
2.7.4	Habitation	48
2.7.5	Economic important	48
2.7.6	Medicine use	49
2.7.7	Insecticides activity	49
2.7.8	Chemical consistent	51
2.8	Cotton <i>Gossypium barbadense</i> (L)	51
2.8 .1	scientific classifications	51
2.8.2	Description	51
2.8.3	Distribution	52
2.8.4	Habitation	52

2.8.5	Used and Economic important of cotton		52
		.Page No	
2.8.6	Medicine uses		53
2.8.7	Chemical content		53
2.8.8	Insecticidal activity		54
2.9			
	Hulba <i>Trigonella foenum-graecum</i> (L)	54	
2.9.1	Scientific classification		54
2.9.2	Description		54
2.9.3	Distribution		55
2.9.4	Economic important		55
2.9.5	Medicine uses		56
2.9.6			
	Chemical constituents	57	2.9.7
	Insecticides activity	58	
2.10	Garlic (<i>Allium sativum</i> (L.))		60
2.10.1	Scientific classification		60
2.10.2	Description		60
2.10.3	Distribution		61
2.10.4	Importance of garlic		62
2.10.5	Medicinal uses		62
2.10.6	Active ingredient		64
2.10.7	Insecticides activity of garlic		64
2.10.7.1	Pesticide activity		64
2.10.7.2	Herbicides activity		67
2.11	Hot pepper <i>Capsicum annuum</i> (L.).		67
2.11.1	Scientific classification		67
2.11.2	Description		68
2.11.3	Distribution		68
2.11.4	Economic important		69
2.11.5	Insecticides activity		69
2.11.6	Medical uses		70
2.11.7	Chemical content		71
2.12	Neem tree <i>Azadirachta indica</i> A. Juss.		71
2.12.1	Scientific classification		71
2.12.2	Description		72
2.12.3	Distribution		72
2.12.4	Importance		73
2.12.5	Insecticidal activity		73
2.12.6	Chemical consistent		76
2.13	Soap		77
2.13.1	Insecticidal activity		77
2.13.2	Mode of action		78
2.14.1	Tomato insect pests		78
2.14.1.1	White fly <i>Bemisia tabaci</i> (Genn)		78
2.14.1.1.1	Scientific classification		78
2.14.1.1.2	Distribution		79
2.14.1.1.3	Host plants		80
2.14.1.1.4	Host Plant Resisitance		81
2.14.1.1.5	Damage and economic importance		81
2.14.1.1.6	Behavior		84
2.14.1.1.7	Life cycle		85
2.14.1.1.8	Control measures		87

2.14.1.1.8.1	Chemical control	88
2.14.1.1.8.2	Botanical control	90
2.14.1.2	Leaf miner <i>Argomyza trifolii</i> (Burgess)	91
	.Page No	
2.14.1.2.1	Scientific classification	91
2.14.1.2.2	Description	92
2.14.1.2.3	Distribution	93
2.14.1.2.4	Host plants	93
2.14.1.2.5	Damage and economic importance	94
2.14.1.2.6	Behavior	94
2.14.1.2.7	Life cycle	95
2.14.1.2.8	Control measures	96
2.14.1.2.8.1	Chemical control	96
2.14.1.2.8.2	Biological control	97
2.14.1.2.8.3	Cultural practices	98
2.14.3	Cotton aphids	99
2.14.3.1	Scientific classification	99
2.14.3.2	Distribution	99
2.14.3.3	Distribution	100
2.14.3.4	Host plants	100
2.14.3.5	Damage and economic importance	101
2.14.3.6	Life Cycle	103
2.14.3.7	Control measures	104
2.14.3.7.1	Chemical Control	104
2.14.3.7.2	Cultural practices	104
2.14.3.7.3	Physical control	105
2.14.3.7.4	Biological control	105
2.14.4	African bollworm <i>Helicoverpa armigera</i>	105
2.14.4.1	Scientific classification	105
2.14.4.2	Description	106
2.14.4.3	Distribution	106
2.14.4.4	Life cycle	107
2.14.4.5	Host plants	107
2.14.4.6	Damage and Economic Importance	107
2.14.4.7	Control measures	108
2.14.4.7.1	Cultural practices	108
2.14.4.7.2	Sanitation	108
2.14.4.7.3	Mechanical control	108
2.14.4.7.4	Trap crops	109
2.14.4.7.5	Crop rotation	109
2.14.4.7.6	Biological control	110
2.14.4.7.7	Botanicals	110
2.14.4.7.8	Bt (<i>Bacillus thuringensis</i>)	111
2.14.4.7.9	Physical methods	111
2.15.	Predators	111
2.15. 1	Lady Beetles (Coccinellidae)	111
2.15.1.1	Scientific classification	111
2.15.1. 2	Description	112
2.15.1.3	Distribution	113
2.15.1.4	Lifecycle	113
2.15.1.5	Use in biological control	115
2.15.2.	Chrysopidae	116
2.15.2.1	Scientific classification	117

2.15.2.2 Description	117
2.15.2.3 Distribution	118
2.15.2.4 life cycle	118

.Page No

2.15.2. 5 Use in biological control	119
2.15.2.6 Defense	120
2.15.2.7 Food	120
2.15.2.8 Habitat	121
2.15. 3 Hover flies or Syrphid flies or flower flies) <i>Simosyrphus spp</i>	121
2.15.3.1 Scientific classification	121
2.15.3.2 Description	122
2.15.3.3 Value in the home landscape and garden	122
2.15.4 Spiders	122
2.15.4 .1 Description	123
2.15.4 .2 Value in the garden	124
2.15.4.5 True Bugs (Order Hemiptera)	124

125

CHAPTER THREE: Materials and Methods

3.1 Experimental Site	125
3.1.1 Shambat Experimental Site	125
3.1.2 Karari Experimental Site	126
3.2 Pest Control Treatments	126
3.2.1 Shambat area	126
3.2.2 Karari area	127
3.3 Laboratory preparation of crude materials	128
3.3.1 Preparation of the seed kernel powder	128
3.3.1.1 Neem seed kernel powder (NSKP)	128
3.3.1.2 Cotton seed kernel powder (CSKP)	128
3.3.2 Preparation of the Seed Hexane Extract	128
3.3.2.1 Neem Seed Hexane Extract (NSK-Hex Extr.)	128
3.3.2.2 Cotton Seed Hexane Extract (CSK-Hex-Extr.)	129
3.3.3 Preparation of the Spray Solution	129
3.3.3.1 Neem and cotton seed kernel- hexane extract	129
3.3.3.2 Preparation of argel-aqueous extracts	129
3.3.3-3 Preparation of Actara	129
3.3.3.4 Preparation of soap	129
3.4 Cultural practices in the Nursery	130
3.5 Land preparation and layout	130
3.6 Field practice	131
3.7 Method of Application	133
3.7 .1 Spraying application	133
3.7 .2 intercropping application	133
3.8 Determination of pest population density	133
3.8 .1 Insect count	134
3.8 .1.1 Homoptera Insect pests	134
3.8 .1.2 Leaf Miner	134
3.8 .1.3 African bollworm	134
3.8.1.4 Natural enemies and beneficial insects	134
3.9 Harvest	135
3.10 Statistical Analysis	135

CHAPTER FOUR: Results

List of Tables

	.Page No
Table (A):- shows the area and production of tomato in the Sudan except southern region for years 1978, 1981, and 2003	9
Table (B):- Nutrient value of some vegetable and quantity elements in 100g from a part of plant which use	11
Table (C): Some physical and chemical properties of the experimental area (Shambat, June 2007).	126
Table (D):-Field lay-out of experiment in season(2006-2007), and (2007-2008) at Shambat area.	132
Table (1): Pre and post spray counts and percent drop in population of whitefly (<i>Bemisia tabaci</i>) adult (per 100 leaves) at Shambat area (winter,2006/2007).	137
Table (2): Pre and post spray counts of damage by leaf miner in tomato at Shambat area (winter, 2006/2007).	139
Table (3): Assessment of pre, post spray counts (per 100 leaves) of different predators(Coccinellidae larvae, Chrysopidae larvae, Hemiptera nymph and spider) on tomato at Shambat area (winter, 2006/2007)	142
Table (4): Assessment of Sound fruits of tomato per plant in the different treatments at Shambat area (winter, 2006/2007).	144
Table (5): Assessment of tomato fruits damaged by African bollworm (<i>Helicoverpa armigera</i>) (Hub) larvae in the different treatments at Shambat area (winter, 2006/2007).	147
Table (6): Assessment of sunscald fruits of tomato in the different treatments at Shambat area(winter, 2006/2007).	149
Table (7): Assessment of tomato plants damaged by leaf curl disease in the different treatments at Shambat area (winter, 2006/2007).	152
Table (8): Assessment of percentage (%) damage by leaf miner in tomato intercropping with fenugreek (Fe), garlic(Ga), and Hot pepper(Ho) at Shambat area (winter, 2006/2007).	154

Table (9): Pre and post spray counts and percent drop in population of whitefly (<i>Bemisia tabaci</i>) adult (per 100 leaves) on tomato at Shambat area 157 (winter, 2007/2008).	
Table (10): Pre and post spray counts of damage by leaf miner in tomato leaves at Shambat area (winter, 2007/2008).	159
Table (11): Pre and post spray counts of Aphids (<i>Aphis gossypii</i>) adult population (per 100 leaves) on tomato at Shambat area (winter, 2007/2008).	162
	.Page No
Table (12): Assessment of pre,post spray counts (per 100 leaves) of different predators (Coccinellidae larvae, Chrysopidae larvae, Hemiptera nymph and spider) on tomato during winter (2007/2008) season at Shambat area.	164
Table (13): Assessment of Sound fruits of tomato per plant (5pick) in the different treatments at Shambat area (winter, 2007/2008).	167
Table (14): Assessment of tomato fruits damaged by African bollworm 168 (<i>Helicoverpa armigera</i>) (Hub) larvae in the different in the different treatments at Shambat area (winter, 2007/2008).	169
Table (15): Assessment of sunscald fruits of tomato in the different treatments at Shambat area (winter, 2007/2008).	172
Table (16): Assessment of tomato plants damaged by leaf curl disease in the different treatments at Shambat area (winter, 2007/2008)	174
Table (17): Assessment of percentage (%) damage by leaf miner in tomato intercropping with fenugreek (Fe), garlic (Ga),and hot pepper (Ho) in at Shambat area (winter, 2007/2008).	177
4.18 Table (18): Pre and post spray counts, and percent drop in population dynamic of whitefly (<i>Bemisia tabaci</i>) adult on tomato (per 100 leaves) at Karari area(winter, 2007/2008).	179
Table (19): Pre and post spray counts of damage by leaf miner in tomato leaves at Karari area (winter, 2007/2008).	182
Table (20): Pre and post spray counts of Aphids (<i>Aphis gossypii</i>) adult population (per 100 leaves) on tomato at Karari area (winter, 2007/2008).	184
Table (21): Assessment of pre, post spray counts (per 100 leaves) of different Predators (Coccinellidae larvae, Chrysopidae larvae, Hemiptera nymph and spider) on tomato at Karari area (winter, 2007/2008).	187

Table (22): Assessment of Sound fruits of tomato per plant (4 picks) in the different treatments at Karari area (winter, 2007/2008).	189
Table (23): Assessment of tomato fruits damaged by Africa bollworm (<i>Helicoverpa armigera</i>) (Hub) larvae in the different treatments at Karari area (winter, 2007/2008).	192
Table (24): Assessment of sunscald fruits of tomato in the different treatments at Karari area (winter, 2007/2008).	194
Table (25): Assessment of tomato fruits damaged by Blossom End Rot in experimental site Karari (winter, 2007/2008).	197
Table (26): Comparative between sun and shade tomato seedling 20 days from growing in nursery (winter, 2006/2007).	199
Table (27): Production of tomato fruits ton/feddan in the different seasons.	202

List of Figures

	.Page No
Fig 1 (a): Pre and post spray counts of whitefly (<i>Bemisia tabaci</i>) adult population (per 100 leaves) on tomato at Shambat area (winter, 2006/2007).	138
Fig 1 (b): Percent drop in population of whitefly <i>Bemisia tabaci</i> adult (per 100 leaves) on tomato at Shambat area (winter, 2006/2007).	138
Fig 2: Pre and post spray counts of damage by leaf miner in tomato leaves at Shambat area (winter, 2006/2007).	140
Fig3: Pre and post spray counts (per 100 leaves) of different predators (Coccinellidae larvae, Chrysopidae larvae, Hemiptera nymph and spider) on tomato at Shambat area (winter, 2006/2007).	143
Fig 4(a): Number of Sound fruits of tomato per plant (9 picks) in the different treatments at Shambat area (winter, 2006/2007).	145
Fig 4(b): Weight assessment of Sound fruits of tomato per plant (9 picks) in the different treatments at Shambat area (winter, 2006/2007).	145
Fig 5(a): Assessment of tomato fruits damaged by African bollworm <i>Helicoverpa armigera</i> (Hub) larvae in the different treatments at Shambat area (winter, 2006/2007).	158
Fig 5(b): Weight assessment of tomato fruits damaged by African bollworm <i>Helicoverpa armigera</i> (Hub) larvae in the different treatments at Shambat area (winter, 2006/2007).	158
Fig 6(a): Number of sunscald tomato fruits in the different treatments at Shambat area (winter, 2006/2007).	150

Fig 6(b): Weight of tomato sunscald fruits in the different treatments at Shambat area (winter, 2006/2007	150
Fig 7: Assessment of tomato plants damaged by leaf curl disease in the different treatments Shambat area (winter, 2006/2007).	153
Fig 8: Percent damage by leaf miner in tomato intercropped with fenugreek (Fe), garlic (Ga), and Hotpepper (Ho) at Shambat area (winter, 2006/2007).	155
Fig 9 (a): Pre and post spray counts in population of whitefly <i>Bemisia tabaci</i> Adult (per 100 leaves) on tomato at Shambat area (winter, 2007/2008).	158
	Page No
Fig 9 (b): Percent drop in population of whitefly <i>Bemisia tabaci</i> Adult (per 100 leaves) on tomato at Shambat area (winter, 2007/2008)	158
Fig 10: Pre and post spray counts of damage by leaf miner in tomato leaves at Shambat area (winter, 2007/2008).	160
Fig 11: Pre and post spray counts of Aphids adult (<i>Aphis gossypii</i>) population (per 100 leaves) on tomato at Shambat area (winter, 2007/2008).	163
Fig 12: Pre and post spray counts (per 100 leaves) of different predators (Coccinellidae larvae, Chrysopidae larvae, Hemiptera nymph and spider) on tomato at Shambat area (winter, 2007/2008).	165
Fig 13(a): Number of Sound fruits of tomato per plant (5 picks) in the different treatments at Shambat area (winter, 2007/2008).	168
Fig 13(b): Weight assessment of Sound fruits of tomato per plant (5 picks) in the different treatments at Shambat area (winter, 2007/2008).	168
Fig 14(a): Assessment of tomato fruits damaged by African bollworm <i>Helicoverpa armigera</i> (Hub) larvae in the different treatments at Shambat area (winter, 2007/2008).	170
Fig 14(b): Weight assessment of tomato fruits damaged by African Bollworm <i>Helicoverpa armigera</i> (Hub) larvae in the different treatments at Shambat area (winter, 2007/2008).	170
	169
Fig 15(a): Number of sunscald tomato fruits in the different treatments At Shambat area (winter, 2007/2008).	173
Fig 15(b): Weight of tomato sunscald fruits in the different treatments at Shambat area.	173

Fig 16: Assessment of tomato plants damaged by leaf curl disease in the different treatments at Shambat area (winter, 2007/2008).	175
Fig 17: Percent damage by leaf miner in tomato intercropped with fenugreek (Fe), garlic (Ga), and hot pepper (Ho) at Shambat Area (winter, 2007/2008).	178
Fig 18 (a): Pre and post spray counts in population of whitefly <i>Bemisia tabaci</i> adult (per 100 leaves) on tomato at Karari area (winter, 2007/2008).	180
Fig 18(b): Percent drop in population of whitefly <i>Bemisia tabaci</i> (per 100 leaves) adult on tomato at Karari area (winter, 2007/2008).	180
	.Page No
Fig 19: Pre and post spray counts of damage by leaf miner in tomato leaves at Karari area (winter, 2007/2008).	183
Fig 20: Pre and post spray counts of Aphids (<i>Aphis gossypii</i>) adult population (per 100 leaves) on tomato at Karari area (Winter, 2007/2008)	185
Fig 21: Pre and post spray counts (per 100 leaves) of different predators (Coccinellidae larvae, Chrysopidae larvae, Hemiptera nymph and spider) on tomato at Karari area (winter, 2007/2008).	188
Fig 22(a): Number of Sound fruits of tomato per plant (4 picks) in the different treatments at Karari area (winter, 2007/2008).	190
Fig 22(b): Weight assessment of Sound fruits of tomato per plant (4 picks) in the different treatments at Karari area (winter, 2007/2008).	190
Fig 23(a): Assessment of tomato fruits damaged by African bollworm <i>Helicoverpa armigera</i> (Hub) larvae in the different treatments at Karari area (winter, 2007/2008).	193 196
Fig 23(b): Weight assessment of tomato fruits damaged by African bollworm <i>Helicoverpa armigera</i> (Hub) larvae in the different treatments at Karari area (winter, 2007/2008).	193
Fig 24(a): Number of sunscald tomato fruits in the different treatments at Karari area (winter, 2007/2008).	195
Fig 24(b): Weight of tomato sunscald fruits in the different treatments at Karari area (winter, 2007/2008).	195
Fig 25(a): Number of tomato fruits damaged by blossom end rot in the different treatments at Karari area (winter, 2007/2008).	198
Fig 26: Comparative between sun and shade tomato seedling after 20 days from growing in nursery.	200
Fig (27): Production of tomato fruits ton/feddan in the different seasons.	203

ABSTRACT

An integrated Pest Management (IPM) approach was adopted to minimize or nullify the use of insecticides in tomato fields. The study was carried out in 2006/2007-2007/2008 seasons at Shambat and Karari areas particularly to find out whether the yield of tomato, *Lycopersicon esculentum* (variety Peto86) can be increased without the use of synthetic insecticides. The following treatments were compared:

1. Neem -seed-kernel hexane extract (2.5%) (*Azadrachta indica*) (No).
2. Cotton-seed-kernel hexane extract (2.5%) (*Gossypium hirsutum*)(Co).
3. Argel leaves aqueous extract at 37.3g/6L (*Solenostemma argel*) (S).
4. Soap solution at 25 ml /4L (So).
5. Actara®25WG at the rate of 0.75g/f (act) as (standard) (M).
6. Intercropping tomato with fenugreek (*Trigonella foenum –graecum*) (F).
7. Intercropping tomato with hot pepper (*Capsicum annum*) (H).
8. Intercropping tomato with garlic *Allium sativum* (G).
9. Intercropping tomato with garad (*Acacia nilotica*) (A)
10. Intercropping tomato with neem (*Azadrachta indica*) seedlings (N).

11. Intercropping tomato with cafour (*Eucalyptus camaldulensis*) seedlings (E).
12. Control (tomato only) (C).

Both treatments spraying with dissolved materials and intercropping were tested to observe the effect of these treatments on the population dynamics of the whitefly *Bemisia tabaci*, leaf miner *Argomyza trifolii*, African bollworm (*Helicoverpa armigera*) (Hub) larvae as well as fruit damage by both pests and by the sun (sunscald) and predators (Coccinellidae larvae, Chrysopidae larvae, Hemiptera nymph and Spider). Observations were also made on other pests (Aphids) and diseases such as Tomato Leaf Curl (TLCV) virus and comparison between damage by leaf miner in tomato and the plants intercropped with tomato such as fenugreek, garlic, and hot pepper were done. In addition to other observations on the damage caused by blossom end rot and the effect of sunlight on the growth of seedlings in the nursery also were made.

The results showed that Actara, neem oil, and cotton oil were the superior treatments in controlling whitefly, whereas cotton oil, neem oil, and garlic were found effective in suppression the population of the leaf miner followed by neem, garad, cafour and Actara. argel seem to be attractive to leaf miners. Actara was better in protecting the natural enemies, followed by garlic, soap, garad, neem oil, argel, and neem .

Tomato fruits showed that, cotton oil and neem oil exhibited good results in controlling *Helicoverpa armigera*, but argel and garad were better in increasing the number of sound fruits. However, Actara, garad, neem and cafour treatments gave good results in the control of *Helicoverpa armigera*. All above mentioned treatments (cotton oil, neem oil, argel and garad) resulted increased the size of tomato fruits. Soap gave the best result in increasing the number of small size of sound fruits.

Assessment of tomato plants damaged by leaf curl disease at Shambat indicated that neem and fenugreek treatments resulted in good protection of tomato plants from leaf curl disease, followed by Actara, cotton oil and soap, whereas argel, garlic, cafour and garad showed high level of damage by leaf curl disease. However there is no damage observed at Karari area in all the treatments.

The results in intercropping plots of fenugreek, garlic, and hot pepper with tomato plants at Shambat area indicated that hot pepper and garlic plants were not damaged by leaf miner while fenugreek plants were susceptible to damage by leaf miner. However, tomato intercropped with hot pepper gave good results; it gave low damage by leaf miner whereas tomato intercropped with fenugreek gave high damage by leaf miners.

neem oil, cotton oil and fenugreek were the superior treatments in the control of Aphids, *Aphis gossypii*, followed by cafour and soap at both Shambat and Karari areas in 2007/2008 season.

Also assessment of tomato fruits damaged by blossom end rot at Karari area showed that cotton oil and neem oil gave the best results in the control of blossom end rot. There was no blossom end rot damage appeared in the experimental site at Shambat.

Comparative study was also done comparing tomato seedlings exposed to the sun and seedlings grown under the shade after 20 days from germination in the nursery. The results indicated that the seedlings which were exposed to the sun were better than the shaded seedlings.

Spraying treatments gave the best result in production of tomato fruits ranging between (160.00- 117.36) ton/feddan which was achieved by argel and soap respectively. Whereas intercropping treatments exhibited low production of tomato fruits ranging between (113.52- 93.60) ton/ feddan, which was achieved by garad and cafour respectively.

Finally, result show that the best production was in (2006/2007) season. Argel gave high production in tomato fruits ranging between (160.00- 42.24) ton/ feddan while cafour gave the last recorded in the production of tomato fruits ranging between (93.60-58.32) ton/ feddan.

الخلاصة

تم إختيار طريقة مكافحة المتكاملة للآفات (IPM) بهدف تخفيض او الغاء إستخدام المبيدات في حقل الطماطم. هذه الدراسة اجريت في موسمي (2006/2007)-(2007/2008) في منطقتي شمبات وكرري للكشف عن إمكانية زيادة إنتاج الطماطم *Lycopersicon esculentum*

(Variety Peto86) بدون إستخدام المبيدات الكيميائية.

تمت مقارنة المعاملات الآتية:-

1. المستخلص الهكساني لنواة بذرة النيم (No) (*Azadrachta indica*) (2.5%).
2. المستخلص الهكساني لنواة بذرة القطن (Co) (*Cotton spp*) (2.5%).
3. المستخلص المائي لأوراق الحرجل (*Solenostemma argel*)(S). تركيز 37.3g/6L.
4. محلول الصابون 25 (So) (ml /4L).
5. أكتارا Actara تركيز®25WG بمعدل 0.75 g/f كمبيد قياسي (M).
6. الزراعة البينية للطماطم مع نبات الحلبة (F). (*Trigonella foenum –graecum*).
7. الزراعة البينية للطماطم مع نبات الشطة (H). (*Capsicum annum*).
8. الزراعة البينية للطماطم مع نبات التوم (G) (*Allium sativum*).
9. الزراعة البينية للطماطم مع شتول القرض (A) (*Acacia nilotica*).

10. الزراعة البينية للطماطم مع شتول النيم (N) (*Azadrachta indica*).

11. الزراعة البينية للطماطم مع شتول الكافور (E) (*Eucalyptus camaldulensis*).

12. الشاهد (طماطم فقط) (C).

أجريت تجربتي رش وزراعة بينية لملاحظة تأثير المعاملات علي الديناميكا السكانية للذبابة البيضاء *Bemisia tabaci* وحافرة الأنفاق *Argomyza trifolii* والاعداء الحيوية وملاحظة الثمار الصحيحة والمصابه بدودة اللوز الأفريقية (*Helicoverpa armigera* Hub) والعامل الفيزيائي ضربة الشمس (sunscauld). تمت ايضاً ملاحظات علي آفات اخري مثل المن *Aphis crassivora* الأمراض كفيروس تجعد أوراق الطماطم (TLCV). كذلك اجريت مقارنة بين إصابة الآفات لنبات الطماطم والنباتات المزروعة معه مثل الحلبة والثوم والشطة. بالإضافة لملاحظات اخري مثل اصابه ثمار الطماطم بالعفن القمي blossom end rot وكذلك تمت دراسة تأثير الضوء علي نمو الشتول في المشتل .

أظهرت النتائج علي اوراق الطماطم أن مبيد اكارا وزيت النيم وزيت القطن هي افضل المعاملات في مكافحة الذبابة البيضاء بينما زيت النيم والقطن والثوم لها تأثير في خفض كثافة حافرة الانفاق يتبعها النيم والقرض والكافور ومبيد اكارا. الحرجل يبدو أنه جاذب لحشرة حافرة الانفاق. كان مبيد اكارا الافضل من حيث عدم تأثيرة علي الأعداء الحيوية يتبعه الثوم والصابون والقرض وزيت النيم والحرجل ونبات النيم.

أظهرت النتائج علي ثمار الطماطم أن زيت النيم وزيت القطن اعطت نتائج جيدة في مكافحة دودة اللوز الأفريقية و الحماية من ضربه الشمس . بينما معاملات مبيد اكارا والقرض والنيم والكافور اعطت نتائج جيدة في مكافحة الدودة اللوز الأفريقية فقط .

الحرجل والقرض أعطيا افضل النتائج في زيادة الثمار السليمة بينما معاملات زيت القطن والحرجل والقرض اعطت ثمار كبيرة في الحجم . الصابون اعطي نتيجة جيدة في زياده عدد الثمار السليمة لكنها صغيرة الحجم .

إختبار اصابة نباتات الطماطم بمرض تجعد الأوراق في شمبات دلت علي أن معامليتي النيم والحلبة اعطت حماية جيدة لنباتات الطماطم من الاصابة بالمرض. بينما لم تلاحظ اي اصابه بالمرض في كرري . الزراعة البينية للطماطم مع نباتات الحلبة والثوم والفلفليه في منطقة شمبات دلت علي ان نباتات الشطة والثوم غير قابلة للاصابة بحافرة الانفاق بينما نبات الحلبة حساس للاصابة بحافرة الانفاق. الطماطم المزروعة مع الشطة اعطت نتائج جيدة

اذ انها اعطت اصابه منخفضة بحافره الانفاق بينما الطماطم المزروعة مع الحلبه اعطت اصابة عالية بحافرة الانفاق.

زيت النيم وزيت القطن والحلبة افضل المعاملات لمكافحة حشرة المن يتبعها الكافور والصابون في منطقتي شمبات وكرري في موسم (2007/2008) .

إختبار اصابة ثمار الطماطم بالعفن القمي في منطقة كرري دلت التجارب علي أن معاملتي زيت النيم وزيت القطن اعطت نتائج جيدة في مكافحة المرض . بينما لم تلاحظ الاصابة في منطقة شمبات.

تمت مقارنة بين الشتول التي تنمو في ضوء الشمس والشتول التي تنمو في الظل بعد 20 يوم من نموها في المشتل حيث دلت النتائج علي أن الشتول التي تنمو في ضوء الشمس افضل من التي تنمو في الظل .

معاملات الرش اعطت انتاجية جيدة تتراوح ما بين (117.36-160.00) طن / للفدان اعطيت بواسطة الحرجل والصابون بالترتيب، م قارن بمعاملات الزراعة البينية حيث اظهرت انتاجية اقل تتراوح ما بين (93.60-113.52) طن / للفدان والتي اعطيت بواسطة القرص والكافور بالترتيب.

اخيراً تشير النتائج الي أن افضل إنتاجية طماطم كانت في موسم (2006/2007) في منطقة شمبات. ومعاملة الحرجل قد أعطت افضل إنتاجية للطماطم والتي تتراوح ما بين (42.24 -160.00) طن / للفدان بينما الكافور اعطي اقل إنتاجية (40.56 -93.60) طن / للفدان.