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CONTROL OF THE COTTON WHITEFLY, *BEMISIA TABACI* (GENN.) ON SQUASH PLANTS

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ABSTRACT: The present work was carried out to evaluate some control practices such as resistant varieties of host plants, chemical and biological control against the cotton whitefly, *B. tabaci* on squash plants.

As for the resistant varieties, it was found that Eskandrani and Topkapl varieties were the most susceptible to infestation with this pest, while Arleka variety was the least one during the two successive seasons (1999 and 2000).

With respect to the efficiency of the tested pesticides against adults and nymphal stages of *B tabaci* , the results revealed that profenofos proved itself to be the highest effective compound against adult and nymphal stages on the three tested squash varieties followed by the mineral oil(KZ-Oil).

The biocide (Biofly) *Beauveria bassiana* recorded the least efficiency against the adult and nymphal stages of *B. tabaci* infesting the three squash verities.

It was found generally that insects reared on Arleka variety were the most susceptible to the all tested pesticides than that reared on the other two varieties (Eskandrani and Topkapl).

Key words: Efficiency insecticides, biocide, varieties, *B. tabaci*, squash plants.

INTRODUCTION

The cotton whitefly , *B. tabaci* is one of the major insect pests attacking many vegetable crops specially cucurbits. Nili plantations are more liable to suffer this pest, it cause direct damage by sucking juice and indirect damage by excretion honey dew which interfere with the photosynthetic process reducing crop development and decreasing the yield. This insect is considered also one of the most known insects which transmit plant viral diseases .

Numerous studies have been done on whitefly control by many authors such as: Abdallah *et al.*

(1991); El-Sayed and El-Ghar (1992); El-Ghar *et al.*, (1994); Adam (1997); Dawood (1999) ; Bhagat and De (2001) and Omar and Hady (2003).

The present work aimed to evaluate some control practices of whitefly such as : using resistant varieties of the hosts,, chemical and biological control in an integrated programme for controlling this pest.

MATERIALS AND METHODS

Tested Compounds

Chemical compounds

1. Selecron (profenofos) 72% E. C., at the rate of 375 ml/100 liters of water.
2. KZ-oil 95% E. C (a mineral oil) at the rate of 1L./100 liters of water.

Biological compound

Biofly is a liquid formulation containing spores of the fungus, *Beauveria bassiana* , each cubic centimeter contains $30x10^6$ condia. This compound was supplied by Nasr Fertilizers and Biocides Company and applied at the rate of 100 ml / 100 liters of water.

Field Experiment

Field trails were carried out throughout the two successive growing seasons, 1999 and 2000 at El-Orman village, El-Senbellaween district, Dakahlia governorate . An experimental area was divided in to four sections of 9 plots each. Each plot consisted of five rows of 6m long and 120 cm. wide. Three squash varieties namely, Arleka, Eskandrani and Topkapl werecultivated in the experimental field using complete blok randomized design with three replicates for each variety .Sawing dates were August 21, 1999 and August 3, 2000 and all agricultural practices were carried out. After 12 days of planting, the tested pesticides were distributed on the experimental sections as follows:

1. In the 1st section, plants of the three squash varieties were grown without any insecticidal treatment to be used as a control.
2. In the 2nd section, plants of the three squash varieties were treated twice (at15days intervals) with profenofos as foliar spray.
3. In the 3rd section, squash varieties were treated twice (at 15 days intervals) with the mineral oil as foliar spray.
4. In the 4th section, squash varieties were treated four times (at 7 days intervals) with *B. bassiana* as foliar spray.

The used insecticides were diluted with water and sprayed using a knapsack sprayer equippied with one nozzle. To evaluate the effectiveness of the pesticides, adult and nymphal stages were counted on 10 leaves per each replicate before spraying and at 2, 5, 8 , 11 and 14 days after

spraying of profenofos and mineral oil, and at 3 and 6 days after spray of *B. bassiana* (Dawood 1999). Adults were directly counted on the selected leaves early in the morning before cutting. For counting the population of nymphs the selected samples (10 leaves for each plot) which examined for counting adults were picked up and transferred immediately to the laboratory for recording the numbers of nymphs using a binocular microscope. Statistical analysis was carried out using (T and F) tests to reveal the significant differences of *B. tabaci* infestation between the pesticidal treated and untreated varieties and also between the varieties themselves. The percent reduction in insect population was calculated according the equation of Hendrson and Tilton (1955).

RESULTS AND DISCUSSION

Relative Susceptibility of the Tested Squash Varieties To *B. tabaci* Infestation

Adult stage

Data presented in Table 1 show that in 1999 season, Tapkapl and Eskandrani were the most susceptible to *B. tabaci* infestation comparing with the Arleka variety. Average numbers of *B. tabaci* adults per leaf of the tested varieties were 82.25, 76.13 and 56.60 adults / leaf, respectively, with significant differences between them. In 2000 season, Arleka was also the least susceptible to adult infestation followed by Topkapl and Eskandrani , recording the average of 70.97, 93.20 and 107.55 adults / leaf, respectively.

The general averages of the both seasons were 63.79, 73.72 and 91.84 adults / leaf for Arleka, Topkapl and Eskandrani varieties, respectively. The tested varieties could be arranged descendingly according to their susceptibility to adult infestation as follows : Eskandrani, Topkapl and Arleka.

Nymphal stage

Data in Table 2 represent the average population of the whitefly nymphs on leaves of squash varieties during 1999 and 2000 seasons, Nili plantation. In 1999 season, the significant differences between the average number of nymphs were 3.02, 2.55 and 1.43 nymphs /leaf of Eskandrani, Topkapl and Arleka, respectively,

In 2000 season, the mean numbers of whitefly nymphs per one leaf of squash varieties wree highly increased to 19.00, 18.22 and 5.60 nymphs /leaf of Eskandrani, Topkapl and Arleka, respectively. The results of Tables 1 and 2 indicated clearly that Eskandrani and Topkapl were the most susceptible to infestation, whereas Arleka variety was the least susceptible .

Table 1. Mean numbers of *Bemisia tabaci* adults per leaf of the three squash varieties at different interval post plantation during 1999 and 2000 seasons.

Varieties	Mean N. of adults individuals days after plantation									General average of both seasons
	14	21	28	35	42	49	56	63	Averages	
					Season 1999					
Arleka	59.10a	72.43a	167.10b	72.30b	45.40b	21.30a	10.36a	4.83a	56.60a	
Eskandrani	113.90b	167.90b	105.23a	37.23a	34.70a	79.10b	47.96c	23.06b	76.13b	
Topkapl	115.10b	161.40b	167.50b	42.97a	32.60a	80.97b	35.00b	22.46b	82.25c	
					Season 2000					
Arleka	149.46a	101.80a	107.46a	92.23a	30.36a	26.43a	30.20a	29.86a	70.97a	63.79a
Eskandrani	246.00c	126.96b	171.40b	101.70b	48.53c	58.36c	48.63c	58.86c	107.55b	91.84b
Topkapl	223.30b	123.43b	128.10a	99.53b	37.40b	49.83b	38.06b	45.93b	93.20b	83.72b

Values followed by the same letter in the same columm are not significantly different at 5% level.

Table 2. Mean numbers of *Bemisia tabaci* nymphs per leaf of the three squash varieties at different interval post plantation during 1999 and 2000 seasons.

Varieties	Mean N. of adults individuals days after plantation									General average of both seasons
	14	21	28	35	42	49	56	63	Averages	
					Season 1999					
Arleka	3.10a	3.63a	2.36c	0.80a	0.23a	0.63a	0.26a	0.43a	1.43a	
Eskandrani	13.43c	7.20b	0.60a	0.50a	0.40ab	0.86a	0.63b	0.56ab	3.02c	
Topkapl	7.70b	3.50a	1.93b	4.80b	0.50b	0.76a	0.43ab	0.80b	2.55b	
					Season 2000					
Arleka	5.00a	11.00a	12.66a	9.76a	4.16b	0.83a	0.80a	0.63a	5.60a	3.52a
Eskandrani	25.63c	66.380b	25.40b	26.80c	2.80a	1.56b	1.70b	1.30b	19.00b	11.01b
Topkapl	17.00b	67.33b	36.03c	15.50b	2.96a	1.76b	1.80b	3.43c	18.22b	10.39b

Values followed by the same letter in the same columm are not significantly different at 5% level.

The present results are in agreement with those obtained by Dawood (1999) who found that squash hybrids of zucchini and Arleka were the least susceptible to *B. tabaci* while Eskandrani variety was the most susceptible

Efficiency of Profenofes Against *B. tabaci* Infesting the Tested Squash Varieties

Adult stage

Data presented in Table 3 showed that generally that in 1999 season, the two sprays of profenofos reduced the population density of *B. tabaci* adults on the tested squash varieties at all inspection dates. The general average of adults / leaf for the two sprays in case of experimented varieties were 20.80, 26.04 and 32.13 for Arleka, tapkopl and Eskandrani, respectively, while the corespounding means were 30.26 , 44.37 and 47.52 adults / leaf of the untreated varieties.

In 2000 season, similar results were also observed profenofos reduced the population of *B. tabaci* adults at all inspection dates. Significant differences were observed between treated and untreated varieties at all inspection dates. The average number of *B. tabaci* adults for the 1st spray were 27.67, 36.02 and 41.63 adults/ leaf for Arleka, Topkapl and Eskandrani, respectively, while these average were 58.17, 66.83 and 74.01 for the same untreated varieties, respectively. For the second spray the average numbers were 16.66, 21.97 and 22.37adults / leaf for Arleka, Topkapl and Eskandrani, respectively, while the corresponding means were 27.18, 46.48 and 50.21 adults / leaf for the untreated varieties. According to the general average of infestation reduction for the two seasons, the efficiency of profenofos against adults of this pest on the treated varieties could be arranged descendinply as follows: Tokapl (45.34), Eskandrani (41.26) and Arleka (40.71%) .

Nymphal stage

The results presented in Table 4 revealed that, in 1999 season, profenofos was more effective agents nymphal stage of *B. tabaci* than adult stage inducing reduction percentages of 96.80, 75.53 and 75.96 of nymphal populations reared on Arleka, Eskandrani and Topkapl varieties, respectively, with significant differences between them. In other words, profenofos was more effective on Arleka variety than the other two varieties.

In 2000 season, a similar trend was observed, nymphs existed on Arleka variety were more sensitive to profenofos than those existed on the other two varieties. It was noticed generally that the highest effect of profenofos against nymphs was recorded (after 2 days of treatment) Then, the mortality

Table 3. Efficiency of profenofo against the adult stage of B. tabaci infesting the tested squash varieties during 1999 and 2000 seasons.

Treatments		No of adults per leaf (% reduction of infestation)• days after spraying														
		Before spray	First spray						Second spray						General average	General average of both season
			2	5	8	11	14	average	2	5	8	11	14	average		
								Season 1999								
	Treated	201.23c	33.13b (58.95)	27.20b (50.98)	27.23a (35.35)	34.00b (35.48)	27.80a (39.36)	29.87a (44.02)	14.26a (40.78)	17.83a (51.84)	11.61a (34.88)	8.46a (46.56)	6.96a (4.54)	11.73a (35.27)	20.80a (39.87)	
Arieka	Untreated	137.10	55.00	37.80	28.70	35.90	31.23	37.74	27.06	41.60	19.26	17.80	8.20	22.79	30.26	
	T. test	**	**	**	*	N.S	**	**	**	**	**	**	**	**	**	
	Treated	140.23a	30.06a (59.23)	23.86a (35.90)	31.33b (50.27)	35.13c (40.23)	80.50c (9.79)	40.18c (39.08)	24.33c (52.60)	38.10c (37.10)	27.50b (36.41)	16.96c (20.51)	13.53b (48.25)	24.09c (38.97)	32.13c (39.03)	
Eskandrani	Untreated	121.90	64.10	32.36	54.76	51.10	77.56	55.98	49.46	58.36	41.66	20.56	64.53	39.05	47.52	
	T. test	**	**	**	**	**	**	**	**	**	**	**	**	**	**	
	Treated	145.80b	33.06b (54.40)	22.96a (39.03)	33.83c (49.23)	14.16a (56.13)	59.93b (18.92)	32.79b (43.54)	15.70b (51.60)	22.30b (39.51)	37.20b (36.08)	14.50b (50.92)	16.50c (44.88)	19.30b (44.60)	26.04b (44.06)	
Topkapl	Untreated	130.83	65.06	33.80	59.20	29.03	66.33	50.81	35.90	40.20	47.10	32.70	33.13	37.93	44.37	
	T. test	**	**	**	**	**	**	**	**	**	**	**	**	**	**	
								Season 2000								
	Treated	107.00a	20.63a (73.25)	24.10a (73.82)	34.16a (29.88)	26.86a (36.28)	32.60a (-7.52)	27.67a (41.14)	18.76b (32.33)	14.36a (49.37)	20.26a (19.89)	13.33a (58.88)	16.56 (48.33)	16.66a (41.76)	22.16a (41.45)	21.48a (40.71)
Arieka	Untreated	107.46	77.26	92.20	48.80	42.23	30.36	58.17	25.23	26.43	23.56	30.20	29.86	27.18	42.67	36.47
	T. test	N.S	**	**	**	**	**	**	**	**	**	**	**	**	**	**
	Treated	169.10b	25.96b (76.81)	45.43c (54.72)	38.50b (27.75)	49.33c (4.45)	45.60c (4.77)	41.63c (33.70)	28.16c (44.89)	16.53b (69.99)	22.60b (41.05)	20.06b (56.08)	21.00b (54.26)	22.37c (53.22)	31.80c (43.48)	31.97c (41.26)
Eskandrani	Untreated	171.40	111.35	101.70	54.00	25.33	48.53	74.01	54.40	58.63	40.80	48.63	48.86	50.21	62.11	54.81
	T. test	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
	Treated	133.20C	26.53b (73.98)	36.16b (68.59)	33.60a (37.32)	44.53b (33.60)	39.30b (19.50)	36.02b (46.60)	15.96a (67.71)	21.13c (54.46)	26.36c (28.68)	20.06b (43.44)	26.33c (38.44)	21.97b (46.59)	29.00b (46.60)	27.50b (45.34)
Topkapl	Untreated	115.13	88.13	99.53	46.33	57.96)	42.20	66.83	53.10	49.83	39.70	38.10	45.93	46.48	56.03	50.32
	T. test	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
I.S.D. 0.05 level									1.521							

•Values in parentheses are the percentages of infestation reduction.

*= Significant .

** High significant .

N.S.= Not significant .

Values followed by the same letter in the same columm are not significantly different at 5% level.

Table 4. Efficiency of profenofos against the nymphal stage of *B. tabaci* infesting the tested squash varieties during 1999 and 2000 seasons

Treatments		No of adults per leaf (% reduction of infestation)• days after spraying														
		Before spray	First spray						Second spray						General average	General average of both season
			2	5	8	11	14	average	2	5	8	11	14	average		
Season 1999																
Arleka	*Treated*	3.06a	0.13b (89.48)	0.00a (100.00)	0.00a (100.00)	0.16a (90.72)	0.23a (87.43)	0.11a (93.60)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.06a (96.80)	
	Untreated	2.20	0.80	0.40	0.56	1.10	1.10	0.84	0.30	0.50	0.60	0.20	1.00	0.52	0.72	
	T. test	*	*	N.S	N.S	*	*	*	N.S	N.S	N.S.	N.S	N.S	N.S	*	
Eskandrani	*Treated*	6.80b	0.06b (93.97)	0.00a (100.00)	0.33b (84.00)	0.36b (88.50)	1.46b (54.04)	0.44c (84.10)	0.00a (100.00)	0.00a (100.00)	0.20b (80.40)	0.23b (69.56)	0.36b (-15.08)	0.16c (66.97)	0.30c (75.53)	
	Untreated	4.90	0.80	0.50	1.50	2.30	2.30	1.42	0.20	0.70	1.60	1.20	0.50	0.84	1.13	
	T. test	*	*	N.S	*	**	*	*	N.S	N.S	*	*	*	N.S	*	
Topkapl	*Treated*	8.33c	0.00a (100.00)	0.00a (100.00)	0.13 (95.77)	0.33b (88.13)	1.23b (59.72)	0.35b (88.72)	0.00a (100.00)	0.00a (100.00)	0.16b (45.82)	0.26b (35.04)	0.20c (35.12)	0.14b (63.20)	0.24b (75.96)	
	Untreated	9.80	1.40	1.10	3.70	3.30	3.60	2.70	0.40	0.50	0.90	1.20	0.90	0.77	1.74	
	T. test	*	**	**	**	**	*	**	N.S	N.S	*	*	N.S	*	**	
Season 2000																
Arleka	*Treated*	26.23a	0.00a (100.00)	0.43b (95.50)	0.56a (93.96)	1.10a (79.65)	1.56a (-31.41)	0.73a (67.74)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.36a (83.77)	0.21a (90.29)
	Untreated	33.00	31.60	12.10	11.80	6.80	1.50	12.76	3.00	0.60	0.80	0.90	0.60	1.17	6.96	3.84
	T. test	**	**	**	**	**	**	**	**	N.S	N.S	N.S	N.S	N.S	**	**
Eskandrani	*Treated*	35.40b	0.00a (100.00)	0.16a (99.42)	2.00b (77.71)	3.40b (62.11)	3.40c (19.04)	1.78b (71.66)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.53b (48.65)	0.09b (89.73)	0.93b (80.70)	0.63b (78.21)
	Untreated	35.90	31.70	29.40	9.10	9.10	4.30	16.31	2.50	1.60	2.20	1.70	1.30	1.86	9.09	5.11
	T. test	N.S	**	**	**	**	*	**	**	**	**	**	*	*	**	**
Topkapl	*Treated*	36.70b	0.00a (100.00)	0.40b (97.12)	1.73b (88.30)	3.36b (58.15)	2.03b (48.48)	2.25c (78.41)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.86b (5.23)	0.60b (65.28)	0.29c (74.26)	1.27c (76.43)	0.75c (76.15)
	Untreated	37.20	22.40	14.10	15.00	8.80	4.00	11.67	5.90	1.80	2.50	1.80	3.40	3.03	7.37	4.55
	T. test	N.S.	**	**	**	**	*	**	**	**	**	*	**	*	**	**
L.S.D. 0.05 level								0.412								

•Values in parentheses are the percentages of infestation reduction.

*=Significant.

**= High significant.

N.S.= Not significant.

Values followed by the same letter in the same columm are not significantly different at 5% level.

decreased gradually as the posttreatment period was prolonged. The average numbers of *B. tabaci* nymphs / leaf for the two sprays of both seasons was differed from one variety to another but the level of infestation was higher at the beginning of the second season than that of the first one

With regard to the general average of infestation reduction for the two seasons, the treated varieties could be arranged as follow: Arleka (90.29%), Eskandrani (78.21%) and Topkapl (76.15%). These results are in agreement with those obtained by Abdallah *et al.* (1991) who found that profenofos was effective against *B. tabaci* infesting cucumber var. Boladi followed by advantage (carbosulfan) and then prothiophos (piothiofos) while fenitrothion seemed to be moderately effective. Also , Bahgat and De (2001) found that monocrotophos 40 E.C. was the most effective in controlling whitefly in Tomato cv. Pusa rubi.

Efficiency of the Mineral Oil (KZ. Oil) Against *B. tabaci* Infesting Squash Plants

According to the results of Table 5 it was found that mineral oil was less effective against adults and nymphal stages of *B. tabaci* than profenofos .

Adult stage

Data presented in Table 5 showed that the two sprays of the mineral oil reduced the adults population density of *B. tabaci*. Difference's between the population of adults on treated and untreated varieties were statistically significant in most inspection dates after spraying .

The averages of adult stage percent reduction of the two sprays in 1999 season were 39.11, 31.28 and 36.25% for Arleka, Eskandrani and Topkapl, respecttively, indicating an effect of the host variety on the susceptibility of adults to the tested oil.

In 2000 season, a similar trend was also found for the effect of the mineral oil on reducing the adults population of *B. tabaci* in all inspection dates. Differencess between the population of adults on the treated and untreated plants were significant in all inspection dates for the two sprays . The averages of percent reduction of adult population of the two sprays were 38.09, 36.40 and 30.32% for the treated varieties, Arleka, Eskandrani and Topkopl, respectively, indicating also that the adults existed on Arleka variety were more susceptible than those existed on the other two varieties. The same results were also found in the general averages of both seasons. Initial effect of the oil was relatively higher in most cases than the residual effect. However, the residual effect of the oil on adults decreased gradually in irregular trend to reach the minimum effect at 14 days post treatment .

Nymphal stage

Data in Table 6 revealed clearly that in both 1999 and 2000 seasons, the tested mineral oil was more effective against *B. tabaci* nymphs than adults. Populations of nymphs were highly reduced as influenced by the oil on all tested three varieties. The nymphs existed Arleka variety recorded the highest level of reduction (81.02%) due to the application of oil than that existeds the other two varieties. According to the general averages of both seasons, it was found that nymphs existed Eskandrani variety were the least susceptible recording (51.61%) reduction only. Population density of nymphs in the second season was relatively higher than that of the first one, so, the results of this season are considered more accurate than that of the first one.

In general, percent reduction of nymphal population was relatively reduced (but irregular) as the period after spraying was prolonged for both sprays of both seasons. Similar results were obtained by Mahgoub (1998) who found that Admire, mineral oil and vegetable oil were effective in reducing the number of immature stages (eggs and nymphs) of *B. tabaci* in both nurseries and open field. The adults were evaluated only in the open field and the results revealed that tested compounds reduced significantly the adult population.

Efficiency of Biocide *Beauveria bassiana* Against *B. tabaci* Infesting Squash Plants

Adults stage

It seems from the results of Table 7 that the tested biocide *(B. bassiana)* was less effective against adults of *B. tabaci* than the other two tested insecticides. Percentages of adult population reduction due to the tested biocide in 1999 season, averaging of 32.82, 25.24 and 24.89 % as general means of 4 sprays for the three tested varieties of squash, Eskandrani, Topkapl and Arleka, respectively. The adults found on Eskandarani variety were the highest susceptible to the biocide comparing with those found on the other two varieties.

Similarly, in 2000 season, there is no an obvious trend for the efficiency of the biocide against the adults of *B. tabaci* .However, the efficiency was higher after the first spray in both seasons and fluctuated for the other three sprays recording the following average 32.16, 30.12 and 28.18% as general means of adult population reduction of this season for Eskandrani, topkapl and Arleka varieties, respectively. General averages of adult population reduction of both seasons were 32.49, 27.78 and 26.56 % for adults existed on Eskandrani , Topkapl and Arleka varieties , respectively. In general

Table 5. Efficiency of KZ-Oil against the adult stage of *B. tabaci* infesting the tested squash varieties during 1999 and 2000 seasons.

Treatments		Before spray	No of adults per leaf (% reduction of infestation)• days after spraying												General average	General average of both season
			First spray						Second spray							
			2	5	8	11	14	average	2	5	8	11	14	average		
Season 1999																
Arleka	*Treated*	200.13c	27.63a (65.58)	29.86a (45.87)	28.10a (32.93)	31.00b (40.85)	32.43a (28.86)	29.80a (42.87)	16.66b (40.70)	11.80a (72.68)	14.76a (26.19)	7.80a (3.70)	5.66a (33.45)	11.34a (35.34)	20.57a (39.11)	
	Untreated	137.10	55.00	37.80	28.70	35.90	31.23	37.74	27.06	41.60	19.26	7.80	8.20	20.79	29.26	
	T. test	**	**	**	N.S	**	N.S	**	**	**	**	N.S	**	**	**	
Eskandrani	*Treated*	41.23a	29.46b (60.32)	29.46a (21.42)	52.20c (17.73)	30.90b (47.81)	76.03c (15.40)	43.61c (32.53)	25.13c (48.17)	29.13b (49.08)	26.60b (34.87)	18.56b (7.90)	22.20b (10.13)	24.32b (30.03)	33.97b (31.28)	
	Untreated	121.90	64.10	32.36	54.76	51.10	77.56	55.98	49.46	58.36	41.66	20.56)	25.20	39.04	47.51	
	T. test	**	**	**	**	**	N.S	**	**	**	**	**	**	**	**	
Topkapl	*Treated*	164.60b	30.70b (62.50)	28.30a (33.45)	34.13b (54.63)	18.96a (48.07)	64.53b (22.67)	35.30b (44.26)	15.93a (54.38)	30.23b (23.83)	39.40c (14.01)	27.26c (14.29)	30.76c (4.55)	31.11c (22.22)	33.21b (36.25)	
	Untreated	130.83	65.06	33.80	59.80	29.03	66.33	50.30	35.90	40.80	47.10	32.70	33.13)	37.93	44.37	
	T. test	**	**	**	**	**	N.S	**	**	**	**	**	*	*	**	
Season 2000																
Arleka	*Treated*	112.50a	36.70b (54.63)	37.86a (60.77)	33.40a (34.62)	26.80a (39.38)	27.43a (13.70)	32.44a (40.62)	14.96a (35.86)	13.80a (42.21)	18.23a (14.36)	15.13a (44.53)	15.96a (40.82)	15.62a (35.56)	24.03a (38.09)	22.30a (38.60)
	Untreated	107.46	77.26	92.20)	48.80	42.23	30.36	58.17	25.83	26.43	23.56	50.20	29.86	27.10	42.67	35.97
	T. test	**	**	**	**	**	*	**	**	**	**	**	**	**	**	**
Eskandrani	*Treated*	178.10b	30.20a (74.39)	56.16b (46.85)	34.20a (39.05)	44.80b (17.61)	44.46c (11.82)	41.96c (37.94)	40.20b (19.35)	29.80c (44.28)	32.36c (13.42)	18.26b (56.94)	26.73c (40.29)	29.47c (34.86)	35.71b (36.40)	34.84b (33.84)
	Untreated	171.14	111.35	101.17	54.00	52.33	48.53	74.01	54.40	58..36	40.80	46.30	48.86	50.21	62.11	54.81
	T. test	**	**	**	**	**	*	**	**	**	**	**	**	**	**	**
Topkapl	*Treated*	112.10a	38.76c (54.82)	64.20c (33.75)	42.06b (6.75)	44.50b (21.16)	37.90b (7.76)	45.42b (24.85)	41.30b (13.40)	17.00b (62.02)	27.03a (24.18)	19.76b (42.23)	25.93b (37.14)	26.21b (35.29)	36.41c (30.32)	34.01b (33.29)
	Untreated	115.13	88.13	99.53	46.33	57.96	42.20	66.83	53.10	49.83	39.70	38.10	45. 93	45.33	56.08	50.32
	T. test	*	**	**	**	**	*	**	**	**	**	**	**	**	**	**
I.S.D. 0.05 level									1.393							

•Values in parentheses are the percentages of infestation reduction.

*= Significant. ** High significant.

N.S.= Not significant.

Values followed by the same letter in the same columm are not significantly different at 5% level.

Table 6. Efficiency of KZ-Oil against the nymphal stage of *B. tabaci* infesting the tested squash varieties during 1999 and 2000 seasons

Treatments		Before spray	No of adults per leaf (% reduction of infestation)* days after spraying												General average	General average of both season
			First spray						Second spray							
			2	5	8	11	14	average	2	5	8	11	14	average		
Season 1999																
Arleka	*Treated*	2.83a	0.30a (70.88)	0.23a (54.77)	0.00a (100.00)	0.06a (95.27)	0.30a (79.44)	0.18a (80.07)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.09a (90.04)	
	Untreated	2.20	0.80	0.40	0.56	1.10	1.13	0.84	0.30	0.50	0.60	0.20	1.00	0.52	0.73	
	T. test	N.S	N.S	N.S	N.S	*	*	*	N.S	N.S	N.S	N.S	N.S	N.S	*	
Eskandrani	*Treated*	5.73b	0.63b (32.37)	0.26a (54.36)	1.53b (12.65)	0.86b (67.78)	1.36b (49.20)	0.97b (43.72)	0.00a (100.00)	0.30b (27.89)	0.70b (26.39)	0.40b (43.92)	0.33b (-12.06)	0.34b (37.23)	0.66b (40.48)	
	Untreated	4.90	0.80	0.50	1.50	2.30	2.30	1.42	0.20	0.70	1.60	1.20	0.50	0.84	1.13	
	T. test		N.S	N.S	N.S	*	*	*	N.S	N.S	*	*	N,S	N,S	*	
Topkapl	*Treated*	8.00c	0.76b (50.55)	0.40a (55.45)	1.53 (49.25)	1.46c (45.54)	2.43c (17.21)	1.32c (43.60)	0.00a (100.00)	0.20b (40.81)	0.40c (12.37)	0.53b (34.28)	0.76c (5.43)	0.38b (38.57)	0.85c (41.09)	
	Untreated	9.80	1.90	1.10	3.70	3.30	3.60	2.70	0.40	0.50	0.90	0.90	1.20	0.77	1.74	
	T. test	*	*	*	**	**	**	**	N.S	N.S	N.S	N.S	N.S	N.S	*	
Season 2000																
Arleka	*Treated*	33.66b	6.50a (79.84)	4.46b (63.81)	3.40c (71.76)	3.73a (46.19)	1.53a (-1.17)	3.92a (51.72)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.36a (60.10)	0.00a (100.00)	0.08a (92.02)	2.00a (72.00)	1.04a (81.02)
	Untreated	33.00	31.60	12.10	11.80	6.80	1.50	12.72	3.00	0.60	0.80	0.90	0.60	1.17	6.96	3.84
	T. test	N.S	**	**	**	**	N.S	**	**	N.S	N,S	N.S	N,S	**	**	**
Eskandrani	*Treated*	29.13a	6.13a (76.16)	2.36a (90.08)	1.70a (76.98)	4.16b (43.57)	2.33b (33.14)	3.72a (63.99)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.60b (34.95)	0.90C (-27.60)	0.30c (61.47)	2.01a (68.25)	1.37a (51.61)
	Untreated	35.90	31.70	29.40	9.10	9.10	4.30	16.31	2.50	1.60	2.20	1.70	1.30	1.86	9.09	5.11
	T. test	**	**	**	**	**	**	**	**	**	**	*	*	*	**	**
Topkapl	*Treated*	57.60b	8.53b (75.40)	8.26c (62.13)	2.53b (89.09)	4.53b (66.73)	2.00b (67.71)	6.38b (72.21)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.40a (55.55)	0.36b (78.41)	0.12b (86.79)	3.25b (79.50)	2.11b (60.50)
	Untreated	37.20	22.40	14.10	15.00	8.80	4.00	11.67	5.90	1.80	2.50	1.80	3.40	3.07	7.37	4.55
	T. test	**	**	**	**	**	*	**	**	**	**	**	**	**	**	**
L.S.D. 0.05 level									0.353							

*Values in parentheses are the percentages of infestation reduction.

*= Significant. ** High significant . N.S.= Not significant .

Values followed by the same letter in the same columm are not significantly different at 5% level.

Table 7. Efficiency of *B. bassiana* against the adult stage of *B. tabaci* infesting the tested squas varieties during 1999 and 2000 seasons

Treatments		No of adults per leaf (% reduction of infestation)• days after spraying														
		Before spray	First spray			Second spray			Third spray			Fourth spray			General average	General average of both season
			3	6	average	3	6	average	3	6	average	3	6	average		
Season 1999																
Arleka	*Treated*	145.10c	29.80c	35.23c	32.51c	22.26a	22.43b	22.35a	10.93a	9.90a	10.41a	5.80a	4.06a	4.93a	17.55a	
			(39.49)	(36.35)	(37.92)	(31.14)	(26.54)	(28.84)	(16.21)	(5.93)	(11.07)	(27.98)	(15.45)	(12.72)	(24.89)	
	Untreated	137.10	46.53	52.30	49.41	48.00	45.33	46.66	26.36	21.26	23.81	17.30	10.33	13.81	33.43	
	T. test	**	**	**	**	**	**	**	**	**	**	**	**	**	**	
Eskandrani	*Treated*	150.56b	25.06b	33.43b	29.25b	26.96b	29.03c	28.00c	18.80b	27.66c	23.23b	17.20b	11. 56c	14.38b	23.71c	
			(36.78)	(27.30)	(32.04)	(38.88)	(6.82)	(22.85)	(61.94)	(58.21)	(60.08)	(1.61)	(31.03)	(16.32)	(32.82)	
	Untreated	121.90	32.10	37.23	34.66	49.13	34.20	41.91	59.03	79.13	69.08	50.00	47.96	48.98	48.66	
	T. test	**	**	*	*	**	**	**	**	**	**	**	**	**	**	
Topkapl	*Treated*	189.16c	23.60a	29.16a	26.38a	31.00c	21.80a	26.40b	17.30b	20.90b	19.10b	16.50b	8.86b	12.68c	21.14b	
			(38.42)	(35.11)	(36.77)	(9.39)	(11.53)	(10.46)	(19.91)	(50.07)	(35.00)	(3.63)	(33.85)	(18.14)	(25.24)	
	Untreated	180.83	36.63	42.96	39.80	50.40	36.30	43.35	35.96	69.70	52.83	57.10	44.70	50.90	46.72	
	T. test	*	**	**	**	**	**	**	**	**	**	**	**	**	**	
Season 2000																
Arleka	*Treated*	109.63a	29.56a	31.60a	30.58a	21.20b	19.53a	20.36a	20.26a	15.90a	18.08a	14.70b	20.46c	17.58b	21.65a	19.60a
			(62.49)	(47.82)	(55.16)	(11.88)	(1.09)	(6.49)	(58.25)	(17.11)	(37.68)	(9.94)	(16.85)	(13.40)	(28.18)	(26.56)
	Untreated	107.46	77.26	59.36	68.31	45.20	37.10	41.15	92.20	36.43	64.31	37.40	56.40	46.90	55.17	38.72
	T. test	N.S	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Eskandrani	*Treated*	171.76c	33.76b	33.53b	33.65b	18.53a	28.83b	23.68b	23.83b	19.36b	21.60b	10.50a	12.96a	11.73a	22.66a	23.19b
			(70.31)	(59.49)	(64.90)	(41.55)	(4.28)	(22.92)	(24.93)	(14.61)	(19.77)	(22.44)	(19.64)	(21.04)	(32.16)	(32.49)
	Untreated	171.40	113.50	82.60	98.05	78.10	74.20	76.15	81.70	58.36	70.03	40.80	48.63	44.71	72.23	60.45
	T. test	N.S	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Topkapl	*Treated*	119.20b	37.26c	49.73c	43.50c	25.66c	29.83b	27.75c	26.73c	24.83c	27.58c	26.50c	14.90b	20.70c	29.88b	25.51c
			(59.17)	(25.32)	(42.25)	(28.12)	(8.60)	(18.36)	(62.01)	(7.33)	(34.67)	(10.11)	(40.25)	(25.18)	(30.12)	(27.78)
	Untreated	115.10	88.13	64.30)	76.21	46.16	42.20	44.18	99.53	43.40	71.46	45.00	38.06	41.53	58.35)	52.53
	T. test	*	**	**	**	**	**	**	**	**	**	**	**	**	**	**
I.S.D. 0.05 level									2.232							

•Values in parentheses are the percentages of infestation reduction.

*= Significant . ** High significant . N.S.= Not significant .

Values followed by the same letter in the same columm are not significantly different at 5% level.

the adults existed on Eskandrani variety were the most susceptible to the biocide followed descendingly by those found on topkapl and arleka varieties respectively.

Nymphal stage

Data in Table 8 showed that, in 1999 season, *B. Bassiona* reduced the population of nymphal stage at all inspection dates. Differences between treated and untreated varieties were significant in all inspection dates with the exception of Arleka variety. The general average of infestation reduction of the four sprays were 86.99, 65.10 and 56.45% for Arleka , Eskandrani and Topkapl, respectively.

In 2000 season as shown in Table 8 the treated squash varieties were significantly differed in *B. tabaci* nymphs densities as compared with the untreated varieties except at the fourth spray and Arleka variety. The general average of reduction in population density of *B. tabaci* nymphs were 72.54, 68.57 and 60.30% for Arleka, Eskandrani and Topkapl.

The present findings are in harmony with the findings of Issa *et al.* (1995) who found that the two formulations of Naturalis affected significantly the different stages of whitefly in tomato plant. Also, Omar and Hady (2003) found that the two fungus formulations biosect and biofar were effective against both immature and adult stages of whitefly in bean plants.

It seems clearly from the summarized results of Table 9 that profenofos proved itself to be the most effective compound comparing with the other two compounds. The general averages of the reduction percentage of *B. tabasi* adults infesting the three tested varieties were 41.79, 34.54 and 27.65% in 1999 season for profenofos, Kz oil and *Beauveria bassiana*, respectively, irrespective of the varieties of squash.

Similar trend was also recorded in the second season, 2000, whereas profenofos remained in the first position recording the highest level of efficiency (43.95% reduction) followed by (Kz –oil (34.96%) while the biocide *Beauveria bassiana* was the weakest compound recording the lowest value of reduction (30.15%). It was noticed generally that reduction of adult population was more obvious after 2 days of profenofos and Kz –oil application then the reduction (residual effect) irregularly decreased until the 14th day (end of observations) . The same result was also recorded for the biocide recording the highest

level of population reduction after 3 days posttreatment then decreased in the second period of examination.

According to the results of both season, adults existed on topkapl variety was the most susceptible to profenofos (both seasons) followed by those infesting Eskandrani and Arleka . As for the effect of squash variety on the susceptibility of adults to Kz-oil it was found that adults found on Arleka variety were the most susceptible followed by Eskandarni and Topkapl. In other words, the squash variety had an effect on susceptibility of adults to the insecticide used for the control . Different trend was recorded for the biocide tested whereas adults found on Eskandrani variety were the most susceptible to this compound followed by those reared on Topkapl then those found on Arleka .

It could be concluded that there is an interaction effect between the insecticide tested and the varieties of squash (hosts) on the susceptibility of *B. tabaci* adults.

Data in Table 10 showed that profenofos induced high decreasing when compared with the other two compounds. General average of the percentage reduction of *B. tabaci* nymphs infesting the three tested varieties were 82.76, 69.51 and 57.13% in 1999 season for profenofos, Biofly and Kz-oil, respectively, irrespective of the varieties of squash .

In the second season, 2000, profenofos remained in the first position recording the highest level of efficiency when compared with the mineral oil and biofly recording the averages of 80.24, 71.43 and 67.54% reduction respectively.

It was noticed generally that decreasing of insect nymphal population due to profenofos was high the first two periods after spraying then decreased without an obvious trend . Similar trend was also recorded for the other two pesticides.

According to the results of both seasons, nymphs existed on Arleka variety were the most susceptible to all tested pesticides rather than that reared on the other two varieties (Eskandrani and Topkapl).

It could be concluded that there is an interaction effect between the insecticides tested and the varieties of squash on the susceptibility of *B. tabaci* nymphal stage. It could be reported also that nymphs were more susceptible to the tested pesticides than adult Tables 9and 10.

Table 8. Efficiency of *B. bassiana* against the nymphal stage of *B. tabaci* infesting the tested squash varieties during 1999 and 2000 seasons

Treatments		No of adults per leaf (% reduction of infestation)• days after spraying														
		Before spray	First spray			Second spray			Third spray			Fourth spray			General average	General average of both season
			3	6	average	3	6	average	3	6	average	3	6	average		
								Season 1999								
Arleka	*Treated*	1.50a	0.40a (70.67)	0.23a (75.59)	0.31a (73.13)	0.06b (49.67)	0.00a (100.00)	0.05a (74.83)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.09a (86.99)	
	Untreated	1.10	1.00	0.70	0.85	0.40	0.10	0.25	0.10	0.70	0.40	0.40	0.50	0.45	0.48	
	T. test	N.S	N.S	N.S	N,S	N,S	N,S	N,S	N.S	N.S	N.S	N.S	N.S	N.S	*	
sEskandrani	*Treated*	2.20b	0.63b (68.72)	0.20a (83.64)	0.41a (76.28)	0.00a (100.00)	0.36b (-5.86)	0.18b (47.07)	0.16b (48.56)	0.20b (25.43)	0.18b (37.04)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	0.19b (65.10)	
	Untreated	2.70	2.50	1.50	2.00	2.20	2.60	2.40	2.30	1.90	2.10	1.40	1.40	1.40	1.97	
	T. test	N.S	*	*	*	*	*	*	*	*	*	**	**	**	*	
Topkapl	*Treated*	2.60b	0.86b (80.55)	1.63b (29.65)	1.25b (55.10)	0.16b (84.02)	0.40b (59.17)	0.31c (71.60)	0.36b (19.04)	0.40b (16.67)	0.38c (17.86)	0.00a (100.00)	0.10a (62.50)	0.05 (81.25)	0.50c (56.45)	
	Untreated	2.80	4.80	2.50	3.65	1.60	1.50	1.55	1.70	1.80	1.75	1.40	1.20	1.30	2.06	
	T. test	N.S.	*	*	*	*	*	*	*	*	*	**	**	**	**	
								Season 2000								
Arleka	*Treated*	12.80a	8.00b (71.39)	2.83b (70.64)	5.40b (71.02)	1.30a (18.24)	0.16a (83.49)	0.75a (5.87)	0.00a (100.00)	0.10a (36.49)	0.15a (68.25)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	1.54a (72.54)	0.81a (79.77)
	Untreated	13.00	28.40	9.80	19.08	5.50	3.50	4.50	0.50	3.30	1.90	0.80	0.90	0.85	6.58	3.53
	T. test	N.S	**	**	**	**	*	**	N.S	**	*	N,S	N,S	N.S	**	**
Eskandrani	*Treated*	26.40c	6.80a (78.19)	1.80a (89.18)	4.28a (83.68)	1.50a (26.34)	0.80b (44.44)	1.05b (35.39)	0.00a (100.00)	0.70b (10.40)	0.35b (55.20)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	1.42a (68.37)	0.80a (66.84)
	Untreated	25.40	30.00	16.00	28.00	18.10	12.80	15.45	1.60	12.50	7.05	1.80	2.00	1.90	13.08	7.35
	T. test	N.S.	**	**	**	**	*	**	**	**	**	**	**	**	**	**
Topkapl	*Treated*	24.40b	10.70c (54.95)	4.40c (69.29)	7.35c (61.94)	1.40a (-26.46)	0.80b (17.11)	1.10b (-9.35)	0.00a (100.00)	0.30a (77.23)	0.15a (88.63)	0.00a (100.00)	0.00a (100.00)	0.00a (100.00)	2.20b (60.30)	1.35b (58.38)
	Untreated	26.40	25.70	15.50	20.65)	3,90	3.40	3.65	1.50	5.60	3.55	2.50	1.80	2.15	7.48	4.77
	T. test	N.S	**	**	**	**	*	*	**	*	*	**	**	**	**	**
L.S.D. 0.05 level									0.256							

•Values in parentheses are the percentages of infestation reduction.

*= Significant. ** High significant. N.S.= Not significant .

Values followed by the same letter in the same columm are not significantly different at 5% level.

Table 9. Reduction percentages of *B. tabaci* adult population infesting the three tested squash varieties as influenced by the three tested pesticides.

Treatment / Squash Varieties	Days post treatment															
	Profenofes						Kz-oil						*Beouveria basiona*			
	2	5	8	11	14	average	2	5	8	11	14	average	3	6	average	General average for varities of both seasons
									1999							
Arleka	49.87c	51.23a	35.12b	41.02b	21.95c	39.83b	53.14b	59.28a	29.56b	22.28c	31.16a	39.08c	28.71b	21.07b	24.89b	
Eskandrani	55.92a	36.50c	43.19a	30.37c	29.02b	39.00b	54.24b	35.25b	26.30e	27.86b	12.77b	31.28c	34.80a	30.84a	32.82a	
Topkapl	53.00b	39.27b	42.66a	53.54a	44.21a	46.54a	58.44a	28.64c	34.32a	31.18a	13.61b	33.24b	17.84c	32.64a	25.24b	
Means irrespective of varieties	52.93	42.33	40.32	41.64	31.73	41.79	55.27	41.06	30.06	27.11	19.18	34.54	27.12	28.18	27.65	
									2000							
Arleka	54.57c	61.60a	24.89b	47.58a	20.41b	41.81c	45.25a	51.49a	24.49b	41.96a	27.26a	38.09a	35.64b	20.72b	28.18b	35.57
Eskandrani	60.85b	62.36a	34.39a	30.27c	29.52a	43.48b	46.87a	45.57c	26.28a	37.28b	26.06b	36.40b	39.81a	24.51a	32.16a	35.86
Topkapl	70.85a	61.53a	33.00a	38.97b	28.97a	46.57a	34.11b	47.89b	15.47c	31.67c	22.45c	30.40c	39.85a	20.38b	30.12a	35.35
Means irrespective of varieties	62.04	61.83	30.76	38.79	26.30	43.95	72.07	78.31b	22.07	36.97	25.26	34.96	38.43	21.27	30.15	
General averages for pesticides of both seasons				42.87						34.75					28.90	
L.S.D.$_{0.05}$ for V									1.753							
L.S.D.$_{0.05}$ for P									2.184							
L.S.D.$_{0.05}$ for V x P									2.520							

V= varieties. P= pesticides.

Values followed by the same letter in the same columm are not significantly different at 5% level.

Table 10. Reduction percentages of *B. tabaci* nymphal population infesting the three tested squash varieties as influenced by the three tested pesticides.

Treatment / Squash Varieties	Days post treatment															
	Profenofes						Kz-oil						*Beouveria basiona*			General average for varities of both seasons
	2	5	8	11	14	average	2	5	8	11	14	average	3	6	average	
								1999								
Arleka	94.92a	100.00a	100.00a	95.36a	93.72a	96.80a	85.44a	77.39a	100.00a	97.64a	89.72a	90.04a	80.09a	93.80a	87.00a	
Eskandrani	96.99b	100.00a	82.20b	79.03b	19.48c	75.54b	66.19c	41.13c	19.52c	55.85b	18.57b	40.25b	79.37a	50.80b	65.09b	
Topkapl	100.00a	100.00a	70.80c	61.59c	47.42b	75.96b	75.88b	48.13b	30.81b	39.91c	11.32c	41.09b	70.90b	42.00c	56.45c	
Means irrespective of varieties	97.30	100.00	84.33	78.66	53.54	82.76	75.64	55.55	50.11	64.47	39.87	57.13	76.78	62.20	69.51	
								2000								
Arleka	100.00a	97.75a	96.98a	89.83a	34.30b	83.77a	89.92a	81.91b	85.88c	53.15b	49.42b	72.06b	72.41b	72.66a	72.54a	83.70
Eskandrani	100.00a	99.71a	88.86c	81.06b	33.85b	80.70b	88.08b	95.04a	88.49b	39.26c	2.77c	62.37c	76.13a	61.01b	68.57b	65.42
Topkapl	100.00a	98.56a	94.15b	31.39c	56.88a	79.26b	87.70b	81.07b	94.55a	61.14a	73.06a	79.50a	57.12c	65.91c	61.52c	65.63
Means irrespective of varieties	100.00a	98.67	93.33	67.53	41.68	80.24	88.56	86.00	89.64	51.18	41.75	71.43	68.55	66.53	67.54	
General averages for pesticides of both seasons				81.50						64.28				68.52		
L.S.D.$_{0.05}$ for V								1.241								
L.S.D.$_{0.05}$ for P								1.709								
L.S.D.$_{0.05}$ for V x P								2.006								

V= varieties. P=pesticides.

Values followed by the same letter in the same columm are not significantly different at 5% level.

REFERENCES

Abdallah , S. A., Samour, E. A.,, and Abdalla, E. F. 1991. Effect of certain pesticides on the cotton whitefly, *Bemisia tabaci* (Genn.), infesting cucumber. Bull.Entomol. Society of Egypt, Econ. Series (14):95-100.

Adam, K. M. 1997. Relativc susceptibility of eight tomato cultivars to infestations with *Bemisia tabaci* (Genn.) with special reference to the percentage of virus infestation and total yield. Annals Agric. Sci., Moshtohor, 35 (2): 1013-1019.

Bhagat, S., and De , B. K. 2001. Effect of insecticides on whitefly leaf curl and yield of tomato. Environment and Ecology , 19s (4): 853-858.

Dawood, M.Z. 1999. Susceptibility of certain commonly cultivated squash and cucumber cultivars to *Bemisia tabaci* (Genn.) (Homoptera: Aleyrodidae) in Beni–Suef Governorate. Egypt. J. Agric. Res., 77(3):1075-1080.

Dawood, M. Z., El-Rafie, K. K.,و Aly, S. A., and Hydar, M. F. 1999. Susceptibility of some tomato varieties and hybrids to whitefly *Bemisia tabaci* (Genn.) infestation in relation to rate of TYLCV infection and the yield .Egypt . J. Agric. Res., 77 (3): 1059-1064.

.El-Ghar, G. E. S.A.,و El-Sayed, A. E. M.,و El-Shiekh, A. E., and Radwan, H. S. A. 1994. Field tests with insecticides and insect growth regulators to control insect pest of cowpea and its effects on certain beneficial insects. Archives of phytopathology and plant protection . 28 (6): 531-543.

El-Sayed, A. E. G. M., and El-Ghar, G. E. S. A. 1992. The influence of normal and low-rate application of insecticides on populations of the cotton whitefly and melon aphid and associated parasites and predators on cucumber. Anzeiger. Fur Schadligskunde, Pflanzenschutz, Vumwellschutz 65 (3): 54-57.

Henderson, C. F., and Titton, E. W. 1955. Tests with acoricides against the brown wheat mite.J. Econ. Entomal., 38 : 157-161.

Issa, Y. H., Omar, H. I. H., El-Khowalka, M. H. M.; El-Maghraby, H.M. and El-Bessomy, M. H.E. 1995. Reduction in the population of different stages of whitefly *Bemisia tabaci* (Genn.) on tomato plants using two formulations of fungal

compound (naturalis) . Egypt. J. Appl. Sci., 10 (8): 599-603.

Mahgoub M. M. A. 1998. Effect of vegetable oil, mineral oil and admire on cotton whitefly *Bemisia tabaci* (Genn.) and tomato yellow leaf virus in tomato fields. Egypt. J. Appl. Sci., 13 (6): 274-281.

Omar, H. E. H., and Hady, S. A. 2003. Effect of two commercial entomopathogenic fungus insecticides *Beauveria bassiana* (Bals.) applied alone or together with natural oil on whitefly under bean field conditions. J. Agric. Sci. Mansoura Univ., 28 (1):6927-6932.

مكافحة ذبابة القطن البيضاء(*Bemisia tabaci* (Geen.
على نباتات الكوسة

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يهدف هذا البحث إلى تقييم بعض طرق المكافحة مثل الأصناف النباتية المقاومة للحشرات ، المكافحة الكيميائية ببعض المبيدات التقليدية مثل البروفينوفوس والزيت المعدنى KZ-Oil وكذلك المكافحة البيولوجية باستخدام المبيد الحيوى بيوفلاى (*Beauveria bassiana*) وذلك ضد ذبابة القطن والطماطم البيضاء *B. tabaci* على ثلاث أنواع من الكوسة وهى أرليكا Arleka واسكندرانى Eskandrani والتوب كابل Topkpal .

وجد أن صنفى الكوسة الإسكندارنى Eskandrani ، التوب كابل Topkapl كانت الأكثر حساسية للإصابة بالذبابة البيضاء بينما الصنف أرليكا Arleka كان أقل إصابة بهذه الحشرة وذلك خلال موسمى التجربة ١٩٩٩ ، ٢٠٠٠م .

فيما يتعلق باختبار المركبات ضد الحوريات والحشرات الكاملة للذبابة البيضاء فقد أوضحت النتائج أن البروفينوفوس Profenofos كان أكثر المركبات فعالية ضد طورى الحشرة (الحورية والحشرة الكاملة) وذلك على أصناف الكوسة الثلاثة المختبرة ثم تلاه فى الترتيب الزيت المعدنى KZ-Oil ثم المبيد الحيوى *B. bassiana* حيث كان أقلهم فعالية .

أوضحت النتائج أيضاً أن الحوريات والحشرات الكاملة للذبابة البيضاء الموجودة على الصنف أرليكا كانت أكثر حساسية للمبيدات المختبرة مقارنة بتلك التى وجدت على الصنفين الأخرين (الإسكندرانى والتوب كابل) .