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Comparative Efficiency of Certain Products against some Piercing-Sucking Pests and their Associated Predators on Cotton Plants

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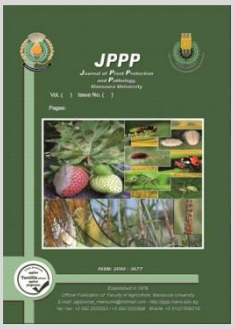

ABSTRACT

The present research work aimed to evaluate the efficacy of five different products, two biocides (abamectin and protecto), two synthetic chemical products (methomyl and chlorpyrifos) and one mineral oil (Kz-oil) against some piercing-sucking insect pests attacking cotton plants and their side effects on the associated predators. The experiment was conducted during 2017season at Kafr ElShenhab village, Mansoura district by using cotton variety Giza94. From results were obtained, it is obvious that methomyl and chlorpyrifos were more effective as initial kill (72.2 and68.2%), (66.4 and51.9%) and (60.1 and78.9%) for aphid, whitefly and predators respectively. But Kz-oil (61.4%) and abamectin (62.9%) were more effective against jassid and spider mites respectively as initial kill% (after 24hrs. of treatment) effect, whereas a moderate or less initial kill effect ranged from32.7 to 51.9% was recorded for the other products. In contrast, abamectin, protecto and Kz-oil were more safety against associated predators as initial kill as follows: 12.2, 9.5and 12.5%respectively. With respect of residual mean and general mean effect, abamectin, protecto and Kz-oil were relatively highly effective against aphids (65.0,63.3 and 61.6%) as residual mean and (61.8, 60.4,and59.5%) as general mean effect and against jassids by moderate effect (50.3, 51.4 and57.7%) as residual mean and (48.7, 48.3 and58.3%) as general mean effect respectively. While other tested products recorded a weak effect as residual mean and general mean effect against all piercing sucking insects except both methomyl and chlorpyrifos were highly effective against predators (78.0 and48.9%) and (75.0 and53.9%) as residual mean and general mean effect respectively.

Keywords: Cotton- Insecticides - Cotton Sucking Pests - Predators

INTRODUCTION

Cotton (*Gossypium hirsutum L.*) is one of the most important fiber crops worldwide. It is an annual crop in tropical and warm temperate regions. In addition to textile manufacturing, it produces seeds with a potential multiproduct base such as hulls, oil, lint and food for animals (Ozyigit *et al.*, 2007).

Production of cotton is limited by different factors among them insect pests (especially piercing sucking pests) are also important. The sucking pests of cotton are aphids (*Aphis gossypii*), jassids (*Empoasca lypicae*), whitefly (*Bemisia tabaci*) and spider mite (*Tetranychus uritcae).* These insect sucking pests in cotton caused deterioration in lint quality and losses in crop production. Also, *Chrysoperla carnea*, *Coccinella septempunectata* and true spiders have been observed as potential certain natural enemies of key pests of cotton and play an important role in the cotton ecosystem (Dhaka and Pareek, 2007). Keeping in view the importance of the crop and major losses caused by different sucking pests.

Finally, the heavily infestation of insect pests led to highly qualitative and quantitative yield losses because aphids suck juices from the young cotton plants and consequently secreting honeydew which cause curl or crinkle of the leaves. As well, cotton is damaged by feeding of both adults and nymphs of whitefly. Both suck the juice from the plant leaves. A honeydew is excreted by whitefly nymphs resulted in a black sooty mold on cotton lint when bolls are in stage of opening. But spider mites have a rapidly intrinsic rate of increase, a highly reproductive rate, and a very short life cycle. Leaves with yellowish or whitish spots usually indicate that spider mites are infesting cotton plant. This led to leaf curl and finally these leaves drop off if damage is serious.

Crop protection is among the most important practices in cotton production. Several pest control methods are highly needed to regulate pest populations, however pesticides still an essential component of integrated pest management in cotton fields. The present research was aimed to evaluate the comparative effect of certain products and their side-effect against some cotton piercing-sucking pests as well as their associated predators.

MATERIALS AND METHODS

The present study was conducted during the season 2017 to evaluate the efficacy of five products from different groups i.e. two biocides (abamectin and protecto), two synthetic chemical insecticides (methomyl and chlorpyrifos) and one mineral oil (Kz-oil) against aphids, whitefly (adult and immature stages), jassids and spider mites and their side effects on some associated predators. Chemical group, common name, trade name, active ingredients, formulation and rates of application ml/100L are given in Table (I). The current products were applied when piercing-sucking pest populations raised up to the economic threshold level (ETL) in the experimental area

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according to the Ministry of Agriculture Recommendation (2016).

Field trial design

The experiments were carried out at Kafr ElShenhab village, Mansoura district. An area of 2000 m^2 was selected to be sown in 21th May 2017 with cotton seeds variety 94. The area of treatment was divided into plots (replicates) including control. The experiment was laid out in Randomized Complete Block Design (RCBD). All agricultural practices were conducted as usual throughout cotton growing season.

Tested products were sprayed in10th August 2017 by recommended rates of application and applied once. Water was used to dilute the dose of each product until reaching the final volume spray solution (m/100L). Spray of the final solution was made using a dorsal solo motor (20 liters in capacity).

The cotton piercing-sucking pests were randomly sampled by collecting 25 cotton leaves from each replicate in the morning from different directions of each replicate within the experimental area. In addition, adults of whiteflies and jassids as well as immature stages of aphids, whiteflies, and spider mites were visually counted in the field from three different levels of 25 plants from each replicate. The upper and lower surfaces of the randomly chosen leaves from each plant level were carefully examined using hand-lens (5x). The insect numbers were recorded one day before application and after one day, three days, five days, seven days, ten days and 12 days from application. In respect to, predators (*Coccinella spp*., *Chrysoparla spp.* and True spiders), 20 plants were selected from each treatment (5 plants per each replicate) to count their numbers.

Co-toxicity was evaluated according to the following equation (Sun *et al.*, 1950).

Modified toxicity index (Co-toxicity) =

$$\frac{\text{General mean of tested one}}{\text{General mean for least one}}$$

Equation of Henderson and Tilton (1955) was used to estimate initial kill (%reduction) after spray, and reduction percentiles of residual mean and general mean on the population of piercing-sucking pests as follows:

$$\text{\% reduction} = 100\left(1 - \frac{A` \times B}{A \times B`}\right)$$

A`= Insect numbers in control before application
A = Insect numbers in control after application
B = Insect numbers in treatment after application
B`= Insect numbers in treatment before application

Mean numbers of pests, initial kill, residual mean and general mean percentages were analyzed using one-way ANOVA. Means were separated using Duncan multiple range test (Duncan, 1955).

Table I. The chemical products applied and their application rates.

No.	Chemicals			
	Trade name	Common name	Chemical group	Rate of application ml or gm /100 L
1	Pestban 48 % EC	Chlorpyrifos	Organophosphorus	500 mL
2	Lannate 90 % WP	Methomyl	Carbamates	150 gm
3	Vertemic 1.8 % EC	Abamectin	Avermectins	40 mL
4	Protecto 9.4% WP	*Bacillus thuringiensis kurstaki*	Biocides	150 gm
5	Kz – oil 95 % EC	Kz – oil	Mineral oils	500 mL

RESULTS AND DISCUSSION

Data presented in Table (1) and showed in Fig (1), it is quite clear that, aphid insects were influenced by greatest values of reduction% in the initial kill (72.2 and 68.9) for methomyl and chlorpyrifos respectively, with non-significant differences in both. A relatively moderate initial kill (I.K.) by reduction % (45.6, 46.8 and 47.2) was estimated for abamectin, protecto and Kz-oil respectively. Non-significant differences also found between them and with significant differences with the first group, but residual mean (R.M.) effect, obtained results showed that abamectin, protecto (biocides) and Kz-oil (mineral oil) produced relatively high effect as % of residual effect (65.0, 63.1 and 61.6%) respectively with no significant difference between them. While other two chemical products methomyl and chlorpyrifos were produced a moderate residual mean (52.1 and 50.1%) respectively by non-significant difference between both and with significant differences with the first group.

As for general mean effect, data in Table (1) also revealed that all tested insecticides were produced a moderate general mean percentages effect as follow (61.8, 60.4, 59.2, 55.4 and 53.3) as a descending order for abamectin, protecto, Kz-oil, methomyl and chlorpyrifos respectively with insignificant difference in between.

Table 1. Efficiency of the tested products (initial kill, residual mean and general mean %) against aphid (*Aphis gossypii)* insects / 100 cotton leaves.

No.	Tested Pesticides	Concentration	Pre-application	No. of Aphis gossypii/100 leaves after Spray at days						%reduction								Co-Toxicity
				1	3	5	7	10	12	Initial kill 1 day	3 days	5 days	7 days	10 days	12 days	Residual Mean	General Mean	
1	Abamectin	40 ml / 100 L	294	255	143	171	193	184	184	45.6[b]	67.4	62.1	58.3	66.5	70.8	65.0[a]	61.8[a]	1.00
2	Protecto	150 gm / 100 L	293	248	202	182	167	173	187	46.8[b]	53.8	59.4	63.7	68.3	70.2	63.1[ab]	60.4[a]	1.02
3	Methomyl	150 gm / 100 L	280	124	186	197	205	260	317	72.2[a]	55.4	54.2	53.4	50.2	47.1	52.1[bc]	55.4[a]	1.11
4	KZ Oil	500 ml / 100 L	497	418	342	338	318	311	291	47.2[b]	53.8	55.7	59.3	66.4	72.7	61.6[ab]	59.2[a]	1.04
5	Chlorpyrifos	500 ml / 100 L	316	157	162	209	247	347	428	68.9[a]	65.7	56.8	50.2	41.1	36.8	50.1[c]	53.3[a]	1.16
6	Control	Control	540	860	805	828	849	1006	1157									

In column, means followed by a common letter (s) are not significantly different, Duncan Multiple Range Test (P≤0.05).

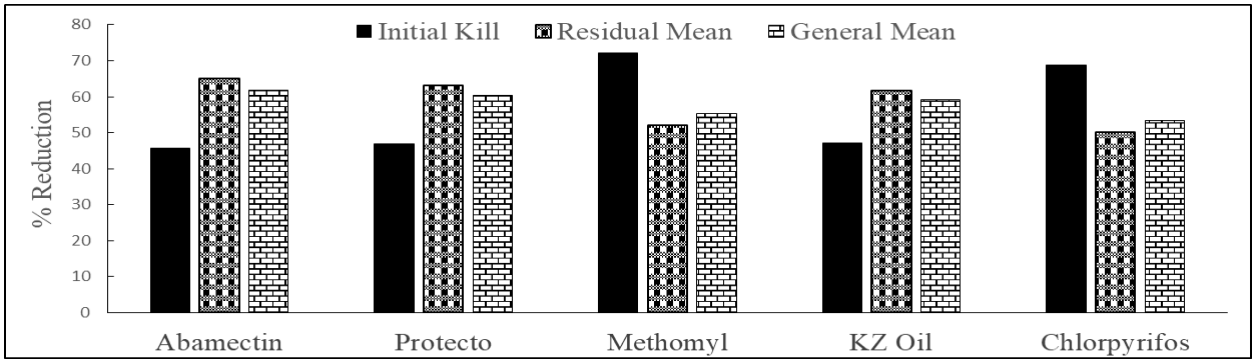

Fig.1. Efficiency of the tested products (initial kill, residual mean and general mean %) against aphid (*Aphis gossypii)* insects / 100 cotton leaves.

For the cotton leafhopper *E. lybica* insects data recorded in Table (2) and illustrated in Fig (2) cleared that, the current products caused a relatively moderate initial kill % (one day after application) (40.6, 34.3, 48.8 and 48.9) for abamectin, protecto, methomyl and chlorpyrifos respectively except Kz-oil showed more initial kill (61.4) (highest one) with significant differences with other products.

While for residual mean (R.M) and general mean (G.M) % effects on jassid, data indicated that in the same Table, each of Kz-oil, protecto and abamectin gave a moderate residual and general mean percentages effect (57.70, 51.14 and 50.30%) and (58.3, 48.3 and 48.7), respectively with non-significant differences between them. But chlorpyrifos and methomyl exhibited less or poor effect (31.78 and 10.18%) and (34.6 and 16.6%) as a residual and general mean, respectively with significant differences between them and between the first group.

With respect for whitefly stages, data presented in Tables (3 and 4) and showed in Figs (3 and 4) indicated that methomyl, Kz-oil and chlorpyrifos were relatively high and moderately effective against the cotton whitefly adult stages with initial kill % (66.4, 53.9 and 51.9%) respectively. While other two pesticides, abamectin and protecto showed less or poor % of initial kill (44.1 and 32.2%) respectively with significant differences between both groups and in between other products. But for residual mean and general mean percentages effect for the cotton whitefly adult stages, data shown in the same Tables indicated that methomyl, Kz-oil, abamectin and protecto gave a moderate effect (50.6, 48.9, 48.0 and 47.1%) and (53.2, 49.7, 47.4 and 44.6%) for residual mean and general mean in a descending order, respectively with non-significant differences. But chlorpyrifos elucidate more less residual mean and general mean effect (31.2 and 34.7%) respectively with significant differences with other tested products.

In respect to the cotton whitefly immature stages, results in Table (4) and in Figure (4) elucidate that Kz-oil, abamectin and chlorpyrifos were moderately or less effective as initial kill in a descending order as follows (45.2, 44.8 and 42.5%), respectively with insignificant differences in between. But both protecto and methomyl was more less effective after one day of application initial kill by (33.8 and 35.3%) respectively with non-significant differences in between and with significant differences with the first group. As for residual mean and general mean% reduction effect for whitefly immature stages, the greatest value was recorded by (65.8 and 55.3%) and (62.3 and 51.7%) for Kz-oil and protecto as residual and general mean respectively, with significant differences. But each of chlorpyrifos, abamectin and methomyl was recorded a moderate or less residual mean and general mean% effect (41.5, 35.8 and 31.5%) and (41.7, 37.3 and 32.1%), respectively with significant differences and non-significant differences either between two chemical groups or within the same chemical group.

In respect to spider mites, results revealed in Table (5) and illustrated in Fig (5), it is obvious that abamectin was more effective (one day) initial kill (62.9%) reduction as compared with both methomyl and chlorpyrifos which gave a moderate initial kill (53.9 and 45.1%), respectively with significant differences and with significant differences with the first product (abamectin). But other two tested products (protecto and Kz-oil) showed less or weak activity one day after spray (initial kill) against spider mites (34.7 and 38.5%), respectively with non-significant difference, but with significant differences with other previous products.

Table 2. Efficiency of the tested products (initial kill, residual mean and general mean %) against jassid (*Empoasca lybica)* insects / 100 cotton leaves.

No.	Tested Pesticides	Concentration	Pre-application	No. of Empoasca lybica /100 leaves after application at days						% reduction						Residual Mean	General Mean	Co-Toxicity
				1	3	5	7	10	12	Initial kill 1 day	3 days	5 days	7 days	10 days	12 days			
1	Abamectin	40 ml / 100 L	570	469	312	263	210	211	195	40.6^{c}	33.1	37.3	40.6	68.4	72.1	50.3^{a}	48.7^{ab}	1.20
2	Protecto	150 gm / 100 L	373	340	197	146	107	187	171	34.3^{d}	35.6	46.7	53.7	57.1	62.6	51.14^{a}	48.3^{ab}	1.21
3	Methomyl	150 gm / 100 L	280	199	216	191	158	279	297	48.8^{b}	5.8	7.4	9.4	14.9	13.4	10.18^{c}	16.6^{c}	3.51
4	KZ Oil	500 ml / 100 L	489	262	153	181	180	204	170	61.4^{a}	61.9	49.7	40.9	64.3	71.7	57.7^{a}	58.3^{a}	1.00
5	Chlorpyrifos	500 ml / 100 L	311	220	156	149	136	261	278	48.9^{b}	38.9	34.8	29.8	28.3	27.1	31.78^{b}	34.6^{b}	1.68
6	Control	Control	404	560	331	297	251	473	495									

In column, means followed by a common letter (s) are not significantly different, Duncan Multiple Range Test (P≤0.05).

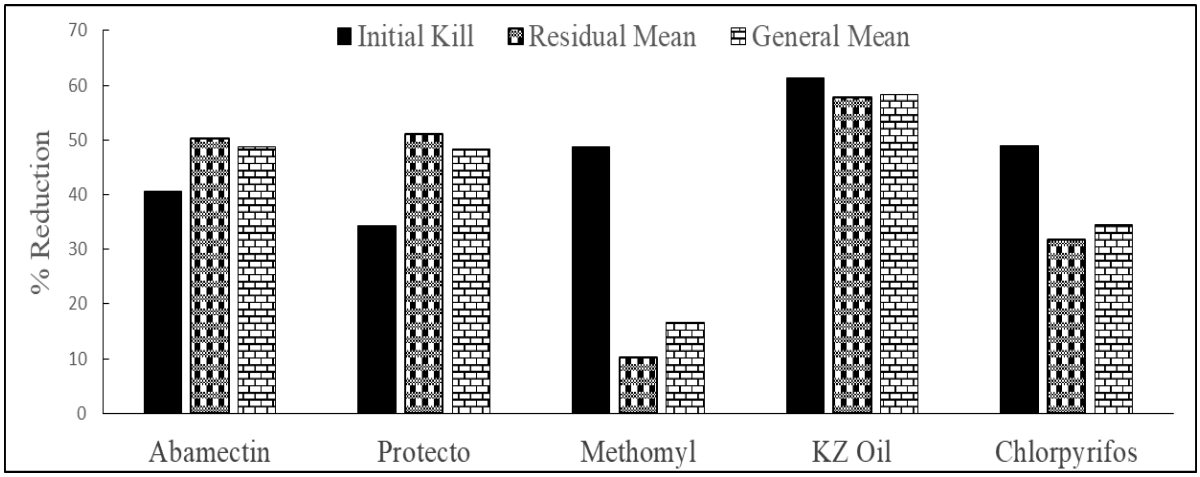

Fig.2. Efficiency of the tested products (initial kill, residual mean and general mean %) against jassid (*Empoasca lybica)* adults/100 cotton leaves.

Table 3. Efficiency of the tested products (initial kill, residual mean and general mean%) against whitefly (*Bemisia tabaci)* adults/100 cotton leaves.

No.	Tested Pesticides	Concentration	Pre-application	No. of *Bemisia tabaci* (adults)/100 leaves after application at days						% reduction						Residual Mean	General Mean	Co-Toxicity
				1	3	5	7	10	12	Initial kill 1 day	3 days	5 days	7 days	10 days	12 days			
1	Abamectin	40 ml / 100 L	168	97	53	59	62	48	55	44.1^{c}	48.1	48.7	47.4	48.6	47.3	48.0^{a}	47.4^{a}	1.12
2	Protecto	150 gm / 100 L	159	112	54	56	62	45	49	32.2^{d}	43.7	48.2	44.3	48.9	50.5	47.1^{a}	44.6^{ab}	1.19
3	Methomyl	150 gm / 100 L	210	73	57	55	48	81	82	66.4^{a}	55.4	61.8	67.7	30.6	37.4	50.6^{a}	53.2^{a}	1.00
4	KZ Oil	500 ml / 100 L	180	86	56	66	70	49	51	53.9^{b}	48.2	45.7	44.7	51.1	54.8	48.9^{a}	49.7^{a}	1.07
5	Chlorpyrifos	500 ml / 100 L	175	87	82	83	81	62	74	51.9^{b}	22.8	30.3	34.1	36.4	32.5	31.2^{b}	34.7^{b}	1.54
6	Control	Control	215	223	130	146	151	120	134									

In column, means followed by a common letter (s) are not significantly different, Duncan Multiple Range Test (P≤0.05).

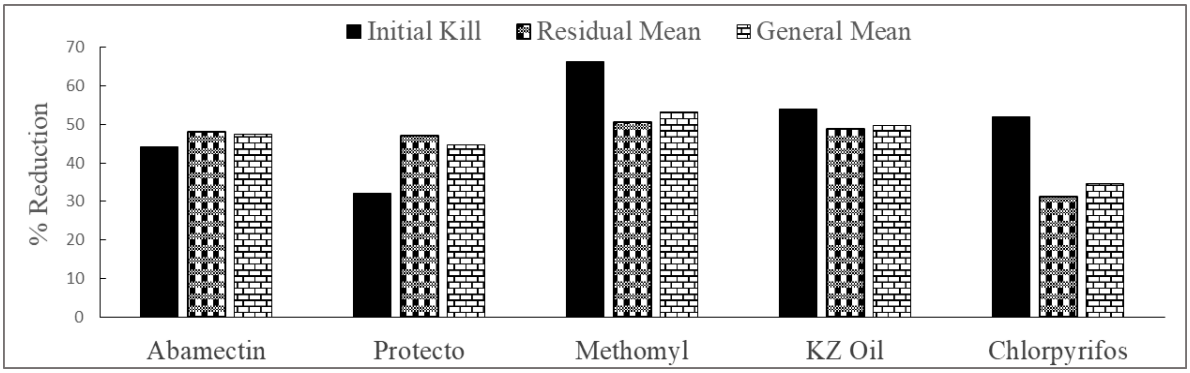

Fig. 3. Efficiency of the tested products (initial kill, residual mean and general mean%) against whitefly (*Bemisia tabaci)* adults/100 cotton leaves.

Table 4. Efficiency of the tested products (initial kill, residual mean and general mean %) against whitefly (*Bemisia tabaci)* immature stages/100 cotton leaves.

No.	Tested Pesticides	Concentration	Pre-application	No. of *Bemisia tabaci* (Immatures)/100 leaves after application at days						% reduction						Residual Mean	General Mean	Co-Toxicity
				1	3	5	7	10	12	Initial kill 1 day	3 days	5 days	7 days	10 days	12 days			
1	Abamectin	40 ml / 100 L	564	262	291	295	262	288	292	44.8^{ab}	37.3	34.4	38.1	32.9	36.2	35.8^{cd}	37.3^{cd}	1.67
2	Protecto	150 gm / 100 L	621	346	291	256	201	178	156	33.8^{c}	43.1	48.3	53.6	62.4	69.1	55.3^{b}	51.7^{b}	0.81
3	Methomyl	150 gm / 100 L	502	274	327	273	230	282	266	35.3^{c}	27.1	31.8	38.9	24.8	34.8	31.5^{d}	32.1^{d}	1.94
4	KZ Oil	500 ml / 100 L	568	262	198	173	152	126	120	45.2^{a}	57.8	61.7	64.3	70.9	74.1	65.8^{a}	62.3^{a}	1.00
5	Chlorpyrifos	500 ml / 100 L	604	293	312	282	253	273	277	42.5^{b}	37.4	41.5	44.2	40.8	43.6	41.5^{c}	41.7^{c}	1.50
6	Control	Control	773	651	637	616	580	589	628									

In column, means followed by a common letter (s) are not significantly different, Duncan Multiple Range Test (P≤0.05).

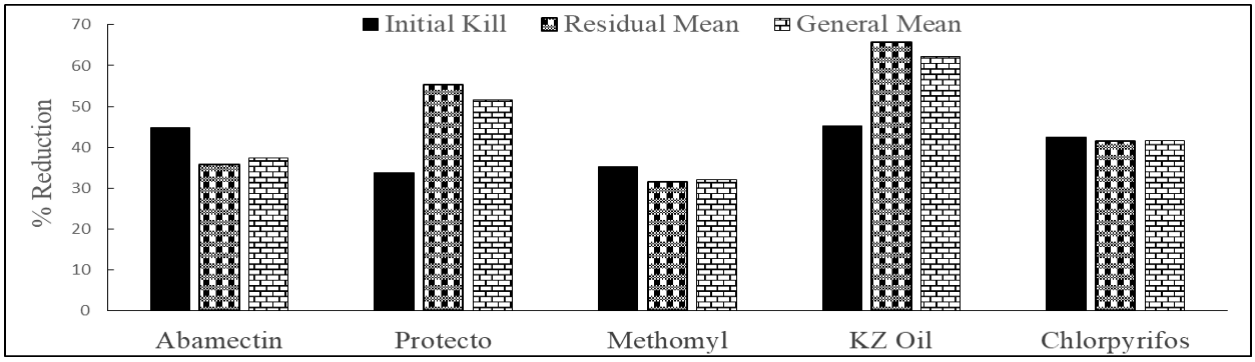

Fig. 4. Efficiency of the tested products (initial kill, residual mean and general mean%) against whitefly (*Bemisia tabaci)* immature stages/100 cotton leaves.

Table 5. Efficiency of the tested products (initial kill, residual mean and general mean %) against spider mites (*Tetranychus urticae)* immature stages/100 cotton leaves.

No.	Tested Pesticides	Concentration	Pre-application	No. of *Tetranychus urtica*/100 leaves after application at days						% reduction						Residual Mean	General Mean	Co-Toxicity
				1	3	5	7	10	12	Initial kill 1 day	3 days	5 days	7 days	10 days	12 days			
1	Abamectin	40 ml / 100 L	321	186	177	138	120	85	87	62.9^{a}	63.6	69.8	73.7	76.7	79.4	72.6^{a}	71.0^{a}	1.00
2	Protecto	150 gm / 100 L	186	190	145	122	91	74	66	34.7^{d}	48.4	53.8	59.9	65.1	72.8	60.0^{b}	55.8^{bc}	1.27
3	Methomyl	150 gm / 100 L	94	68	92	90	84	75	94	53.9^{b}	35	32.8	26.9	30.5	23.6	29.8^{c}	33.8^{d}	2.10
4	KZ Oil	500 ml / 100 L	141	136	85	59	35	46	42	38.5^{cd}	60.4	70.7	79.7	71.4	77.5	71.9^{ab}	66.4^{ab}	1.07
5	Chlorpyrifos	500 ml / 100 L	139	119	100	100	97	105	137	45.1^{c}	52.4	49.7	42.9	33.6	24.6	40.6^{c}	41.4^{cd}	1.72
6	Control	Control	78	122	118	111	95	89	102									

In column, means followed by a common letter (s) are not significantly different, Duncan Multiple Range Test (P≤0.05).

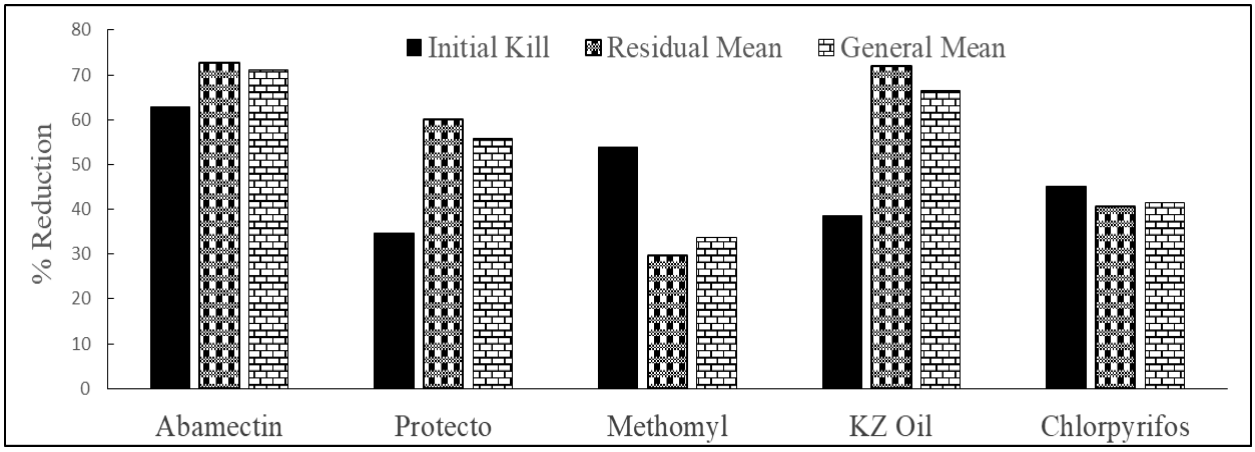

Fig. 5. Efficiency of the tested products (initial kill, residual mean and general mean %) against spider mites (*Tetranychus urticae)* immature stages/100 cotton leaves

On the other side, data presented in the same Table (5) for residual mean and general mean effects showed that both abamectin and Kz-oil resulted superior residual and general mean effect percentages (72.6 and 71.9%) and (71.0 and 66.4%) respectively against spider mites (with insignificant differences). While protecto gave a moderate or over residual mean and general mean percentages effect (60.0 and 55.8%) with significant and insignificant differences with abamectin and Kz-oil respectively. The other two tested products chlorpyrifos and methomyl were regarded weak and or less percentages of residual and general mean (40.6 and 29.8%) and (41.4 and 33.8%), respectively with non-significant differences and with significant differences with other tested chemicals.

On the other side, regarding for certain associated predators [*Chrysoperla carnea* (adult and larvae), *Coccinella undecimpunctata* and true spider], data presented in Table (6) and depicted in Fig (6), as the percent reduction as for one day after application (I.K.) both synthetic chemical products (chlorpyrifos and methomyl) were more effective (78.9 and 60.1%), respectively with significant difference. While, Kz-oil, abamectin and protecto (mineral oil and biocides) were recorded very poor effect as initial kill (12.5, 12.2 and 9.5%) respectively with non-significant difference between them but as for residual mean and general mean effect, data presented in the same Table (6) indicated that both methomyl and chlorpyrifos recorded high and moderate residual and general mean effect (78.0 and 48.9%) and (75.0 and 53.9%) respectively with significant difference. While other products showed more less or poor percentages of residual mean and general mean effect as follows (22.3, 33.3 and 17.9%) and (20.6,

29.4 and 17.0%) for abamectin, protecto and Kz-oil respectively with significant and non-significant differences in between them and between protecto with both abamectin and Kz-oil. Finally, these last three products were more safety against predators.

The results of the present experiment are discussed as following. This study is not in agreement and accordance which was comparable to those of (Albuguequer *et al*, 1999 and Scarpellini and Nakamura, 1999). In their studies, imidacloprid showed high reduction effect in aphid, jassid and whitefly populations. Hamid (2000) indicated that Kz-oil achieved relatively high initial kill against aphids (71.62%), whereas abamectin had the lowest effect against aphids (32.65%). In contrast, these both products recorded less and moderate effects on jassid and whitefly (both immature and adult stages) as initial kill and general mean, respectively. But, these two products had less and no initial kill effect on associated predators. In addition, both imidacloprid and cypermethrin maintained jassid and whitefly populations below ETL (Mohan and Katiyar, 2000).

El-Zahi (2005) found that Kz-oil gave less effect against whiteflies as initial kill and general mean %reduction, Whereas abamectin exhibited less toxicity on adults than immature stages of whitefly.

Table 6. Efficiency of the tested products (initial kill, residual mean and general mean %) against Predators/100 cotton leaves.

No.	Tested Pesticides	Concentration	Pre-application	No. of Predators/100 leaves after application at days						% reduction						Residual Mean	General Mean	Co-Toxicity
				1	3	5	7	10	12	Initial kill 1 day	3 days	5 days	7 days	10 days	12 days			
1	Abamectin	40 ml / 100 L	45	27	29	26	31	33	34	12.2^{c}	30.6	24.4	17.4	18.6	20.3	22.3^{d}	20.6^{c}	3.64
2	Protecto	150 gm / 100 L	50	31	36	29	26	26	28	9.5^{c}	21.2	24.5	37.4	42.3	41.2	33.3^{c}	29.4^{c}	2.56
3	Methomyl	150 gm / 100 L	52	14	8	9	12	8	13	60.1^{b}	83.4	77.3	72.6	83.4	73.2	78.0^{a}	75.0^{a}	1.00
4	KZ Oil	500 ml / 100 L	57	34	41	35	40	43	46	12.5^{c}	21.1	19.8	17.5	16.5	14.7	17.9^{d}	17.0^{c}	4.41
5	Chlorpyrifos	500 ml / 100 L	45	7	18	17	22	20	24	78.9^{a}	56.6	50.4	42.9	49.7	44.7	48.9^{b}	53.9^{b}	1.39
6	Control	Control	57	39	52	43	48	51	54									

In column, means followed by a common letter (s) are not significantly different, Duncan Multiple Range Test (P≤0.05).

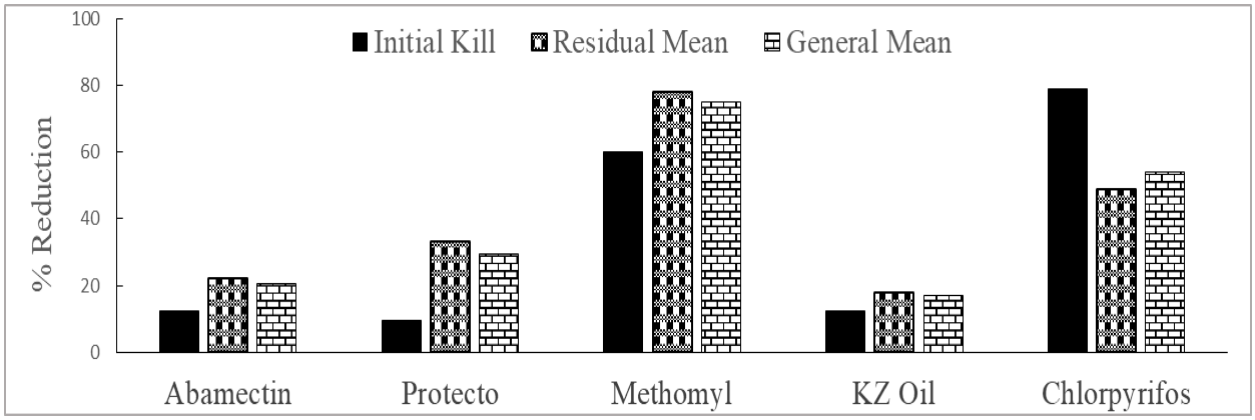

Fig. 6. Efficiency of the tested products (initial kill, residual mean and general mean%) against predators/100 cotton leaves.

The side effects on predators showed that both abamectin and Kz-oil had less initial kill and general mean percentiles. Zidan *et al.* (2012) found that both chlorpyrifos and methomyl were effective against aphid, while both had a low to moderate effect against whitefly and jassid stages. As well both chlorpyrifos and methomyl exhibited less toxic against predators. Ahmed *et al.* (2014) mentioned that imidacloprid seems to be safe to beneficial insects and toxic for piercing-sucking pests compared to profenofos and bifenthrin.

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مقارنة كفاءة بعض المبيدات ضد بعض الحشرات الثاقبة الماصة والمفترسات المرتبطة بها على نبات القطن

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أُجريت تجربة حقلية على نبات القطن صنف جيزة ٩٤ خلال موسم ٢٠١٧ بقرية كفر الشنهاب - مركز المنصورة- محافظة الدقهلية لتقييم مدى فعالية خمسة مبيدات من مجاميع مختلفة منها اثنان من المركبات الحيوية (أبامكتين ، بروتكتو) واثنان من المركبات المصنعة (الميثوميل ،الكلوربيريفوس) بالإضافة إلى الزيت المعدني كزد أويل ضد حشرات القطن الثاقبة الماصة وكذلك فعاليتهم على بعض المفترسات المصاحبة لها.أوضحت النتائج التي تم الحصول عليها أن الميثوميل والكلوربيريفوس كانا أكثر كفاءة بعد ٢٤ ساعة من المعاملة حيث سببت نسبة موت (٧٢,٢ ، ٦٨,٢ ٪) ، (٦٦,٤ ، ٥١,٩٪) ، (٦٠,١ ، ٧٨,٩ ٪) وذلك على من القطن وذبابة القطن البيضاء والمفترسات على التوالي .بينما أظهرت المعاملة بالزيت المعدني كزد أويل والأبامكتين نسب موت (٦١,٤ ، ٦٢,٩%) لنطاط أوراق القطن (الجاسيد) و العنكبوت الأحمر ذو البقعتين (الأكاروس) على التوالي، في حين كانت المركبات الأخرى المختبرة متوسطة أو قليلة التأثير حيث أعطت نسب موت تتراوح من ٣٢,٧% إلى ٥١,٩ % بعد ٢٤ ساعة من المعاملة. كما أظهرت النتائج أن مركبات الأبامكتين والبرتكتو والزيت المعدني كانوا اكثر أماناً من المركبات الأخري على المفترسات حيث كانت نسبة الموت لهذه المركبات ١٢,٢ ، ٩,٥ ، ١٢,٥٪ على التوالي.كما أوضحت النتائج أن مركبات الأبامكتين والبروتكتو والزيت المعدني ذات كفاءة عالية على كل من المتوسط العام ومتوسط الأثر الباقي لحشرة المن فى حين كانت كفاءتها متوسطة ضد نطاط أوراق القطن (الجاسيد) ، بينما كان مركبى الميثوميل والكلوروبيريفوس أكثر كفاءة ضد المفترسات.