EFFECT OF CERTAIN PESTICIDES ON SOME PHYTOPHAGOUS AND PREDACEOUS MITES ASSOCIATED WITH CITRUS TREES

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(Manuscript received 28 March 1993)

Abstract

Three field experiments were conducted to evaluate the effectiveness of Fenpyroximate, Flufenoxuron, Abamectine, super Shokrona and Shokrona oils against *Eutetranychus orientalis (Klein), Brevipalpus californicus* (Banks), *Phyllocoptruta oleivora* Ashmead and their side effect on the predaceous mite, *Euseius scutalis* Athias-Henriot on Navel orange citrus trees . The first experiment was conducted at Wasta station, Beni-Suef Governorate to estimate the effect of the tested compounds against *E. orientalis,* the second experiment was performed at Kafr-Mansour village, Qualubia Governorate to control the flat mite *B. californicus* and the third experiment was conducted at Desones District, Damanhour city , Behera Governorate to control Ph. oleivora . The results revealed that fenpyroximate was the most effective compound against E. orientalis and *B. californicus* followed by Flufenoxuron and super Shokrona oil. Shokrona oil was the least effective . With regard to the effect on the predatory mite *E. scutalis* , Flufenoxuron and fenpyrosximate showed the highest effect, while Super Shokrona oil was of intermediate effect. The lowest reduction in the predatory mite population was with Shokrona oil.

Fenpyroximate and Abamectin were the most effective compounds against *Ph. oleivora.* Flufenoxuron, Super Shokrona and Shokrona oil came next, respectively.

Percentages of rusty fruits in trees treated with Fenpyroximate and Abamectin were less than in any other treatment.

INTRODUCTION

Citrus fruits are considered among the best export commodities in the world.

The cultivated area of citrus in Egypt has been rapidly expanded year after year, and nowadays it reached about 365000 feddans.

Phytophagous mites , *Eutetranychus orientalis* (Klein), *Brevipalpus californicus* (Banks) and *Phyllocoptruta oleivora* Ashmead, are important pests infesting citrus trees. They affect the quantity and the size of fruits and also reduces their quality (Attiah *et al.*, 1967, Wafa *et al.*, 1969 Zaher *et al.*, 1970 ; Attiah and Wahba, 1971). Infestation with these mite species are common in many localities and each species predominates in areas of favourable climatic conditions.

In the present study, three trials were conducted to evaluate the efficacy of Fenpyroximate, Flufenoxuron and the two local mineral oils, Shokrona and super Shokrona against *E. orientalis, B. californicus , Ph. oleivora* and their side effects on the predatory mite *E. scutalis* on citrus trees.

MATERIALS AND METHODS

Three experiments were conducted in three different localities cultivated with Navel orange trees. In these trials, the complete randomized block design was followed and spraying was applied only once by means of a motor sprayer. Samples were collected at weekly intervals after spraying for one month A pre-count was done before spraying to estimate the percentage of reduction in mite population according to Henderson and Tilton equation (1955).

The first experiment was conducted at Wasta station, Beni-Suef Governorate, on citrus trees highly infested with *E. orientalis* . The second experiment was done at Kafr Mansour village, Qualubia Governorate on citrus trees infested with *B. californicus* and the third was conducted at Desones District, Damanhour city, Behera Governorate, on citrus trees infested with *Ph. oleivora.*

The 1st and 2nd experiments were divided into five treatments including the check treatment, each comprised four replicates (each of four trees).

The chemicals used were : NNI-850 (Fenpyroximate 5% W/W), tert-butyl (E)-4- ((1,3-dimethyl-5 phenoxypyrazo 1 -4 yl) methylenamino-oxymethyl) ben-

zoate , at the rate of 50ml/100l of water ; Cascade (Flufenoxuron 5% E.C.), (1-(4-(2-chloro-4 (trifluoromethyl)phenoxy) 2 - fluorophenyl)-3-(2,6 diflurobenzyl) urea, at the rate of 25m/100l of water; Super Shokrona oil 95% E.C. at the rate of 1.5l /100 l of water; Shokrona oil 95% E.C. at the rate of 1.5 l /100 l of water .

The two mineral oils included the same base oil but Shokrona oil contains 5% emulsifier of polyethylene glycol (400) dioleate, while super Shokrona oil contains 10% of the same emulsifier. The two oils were formulated as emulsifiable concentrates by the Central Agricultural Pesticies Laboratory, Agricultural Research Centre, Dokki , Egypt.

Spraying was done on July 28th and on September 8th, 1992 for the first and second experiments. Counts of mites on each inspection date for the two experiments were done by randomized picking of 20 leaves or fruits from each replicate (80 leaves or fruits from each treatment). The moving stages of the predaceous mite *E. scutalis* were taken into consideration while counting the number of *B. californicus* of each treatment in the second trial.

The third experiment was divided into six treatments including the control, each replicated four times and each replicate comprised four trees. Spraying took place on September 3rd 1992. The materials used and their rates were as follows: NNI-850 (Fenpyroximate 5% E.C.) at the rate of 100ml/100l of water; Vertimec (Abamectin 1.8% E.C.) at the rate of 30ml/100l of water.; Cascade (Flufenoxuron 5% E.C.) at the rate of 25 ml/100l of water; Super Shokrona oil 95% E.C. at the rate of 1.5 l / 100 of water. Shokrona oil 95% E.C. at the rate of 1.5l /100 l of water.

Count of mites for each inspection was carried out at weekly intervals after spraying in the field by the aid of a stereo-scopic microscope. From each replicate, 8 fruits were examined (fruits from each treatment). At the end of the experiment, the total number f fruits as well as the rusty fruits were counted by means of a mechanical counter in order to determine percentage of rusty fruits in each treatment.

RESULTS AND DISCUSSION

Table 1 indicated that Fenpyroximate, Flufenoxuron and Super Shokrona oil were highly potent against the brown mite *E. orientalis* with 92.01, 88.08 and 81.03% reduction in mite population, respectively. Shokrona oil seemed to be the least effective as it resulted in 66.87 % reduction in mite population. Fenpyroximate was the most effective compound followed by Flufenoxuron then Super Shokrona oil.

The effect of the tested compounds on *B. alifornicus* populations is presented in Table 2 . Data revealed that fenpyroximate was the most effective compound in reducing mite population (91.13%). Reduction percentages of mite populations in the other treatments were less than 90% (86.23, 78.37 and 62.46% for Flufenoxuron, Super Shokrona and Shokrona oils , respectively). It was clear that *E. orientalis* was more susceptible to the tested compounds than *B. californicus.*

The detrimental effect of the tested compounds on the perdatrory mite, *E. scutalis* is shown in Table 3. Flufenoxuron and Fenpyroximate decreased the mite population by 77.30 adn 70.18 %, respectively . The effect of Super Shokrona oil was intermediate with 37.21% reduction in the predatory mite population. The lowest reduction in the population was in case of Shokrona oil. It can be concluded that Shokrona and Super shokrona oils had the least toxic effect on the predatory mite, *E. scutalis*, while Flufenoxuron and Fenpyroximate were the most toxic.

As indicated in Table 4, Fenpyroximate and Abamectin were the most effective compounds in reducing mite population of *Ph. oleivora* (93.03 and 91.99%, respectively). Reduction percentages of mite populations for the other compounds were less than 90% . Flufenoxuron and Super Shokrona oil produced 87.64 and 82.22% , respectively. Shokrona oil was the least effective in this regard.

Results in Table 5 showed that percentage of rusty fruits of trees treated with Fenpyroximate was less than those of the other treatments, reaching 0.85% the percentages of rusty fruits were 1.57, 5.78, 8.87 and 15.43% for Abamectin, Flufenoxuron, Super Shokrona and Shokrona oils respectively corresponding to 48.46 % in the control. McCoy *et al.* (1982) indicated that in the field , Avermectin B1 was effective against the citrus mite . El-Halawany *et al.* (1987) demonstrated that Avermectin B , Dithane M-45 and Comazin were satisfactory in contolling the citrus rust mite, *Ph. oleivora.*

Table 1. Effect of different pesticides against *E. orientalis* (Klein) infesting Navel orange orchard at Wasta station, Beni-Suef Governorate.

Treatment	Rate/ 100 L water	No. of mites before treatment 28/7/92	No. of moving stages/80 Navel orange leaves and percentages of reduction at indicated sampling dates								Average reduct-ion %
			4/8/1992		11/8/1992		18/8/1992		25/8/1992		
			No.	% Reduction	No.	% Reduction	No.	% Reduction	No.	% Reduction	
Fenpyroximate	50 ml	842	68	92.83	61	92.79	66	91.36	75	90.96	92.01
Flufenoxuron	25 ml	799	107	88.28	87	89.16	79	89.11	112	85.78	88.08
Super Shokrona oil	1.5 L	804	154	83.24	148	81.68	145	80.14	166	79.06	81.03
Shokrona oil	1.5 L	831	291	69.35	265	68.27	253	66.47	300	63.39	66.87
Check	---	841	930	---	818	---	739	---	802	---	---

Table 2. Effect of different pesticides against *B. californicus* (Banks) infesting Navel orange orchard at Kafr Mansour Village, Qualubia Governorate.

Treatment	Rate/ 100 L water	No. of mites before treatment 8/9/92	No. of moving stages/80 fruits and percentage of reduction at indicated sampling dates								Average reduct-ion %
			15/9/1992		22/9/1992		29/9/1992		6/10/1992		
			No.	% Reduction	No.	% Reduction	No.	% Reduction	No.	% Reduction	
Fenpyroximate	50 ml	773	60	91.84	70	91.42	119	90.39	102	90.89	91.13
Flufenoxuron	25 ml	791	92	87.78	109	86.95	186	85.32	173	84.90	86.23
Super Shokrona oil	1.5 L	698	123	81.49	158	78.56	244	78.18	250	75.28	78.37
Shokrona oil	1.5 L	705	236	64.85	268	64.00	429	62.02	419	58.99	62.46
Check	---	752	716	---	794	---	1204	---	1089	---	---

Table 3. Effect of different pesticides on the predatory mite, *E. scutalis* inhabiting Navel orange trees at Kafr Mansour Village, Qualubia Governorate.

Treatment	Rate/ 100 L water	No. of mites before treatment 8/9/92	No. of moving stages/80 fruits and percentage of reduction at indicated sampling dates								Average reduct-ion %
			15/9/1992		22/9/1992		29/9/1992		6/10/1992		
			No.	% Reduction	No.	% Reduction	No.	% Reduction	No.	% Reduction	
Shokrona oil	1.5 L	291	188	31.76	201	14.88	193	23.31	157	28.84	24.70
Super Shokrona oil	1.5 L	203	129	32.88	83	49.61	124	29.37	97	36.98	37.21
Fenpyroximate	50 ml	235	21	90.56	45	76.40	68	66.54	94	47.24	70.18
Flufenoxuron	25 ml	260	69	71.97	41	80.57	37	83.54	53	73.11	77.30
Check	---	244	231	---	198	---	211	---	185	---	---

Table 4. Effect of different pesticides against *Ph. oleivora* infesting Navel orchard trees at Desons, Damanhour city, Behera Governorate.

Treatment	Rate/ 100 L water	No. of mites before treatment 3/9/92	No. of moving stages/80 fruits and percentage of reduction at indicated sampling dates								Average reduct-ion %
			10/9/1992		17/9/1992		24/9/1992		1/10/1992		
			No.	% Reduction	No.	% Reduction	No.	% Reduction	No.	% Reduction	
Fenpyroximate	100 ml	2812	173	94.00	208	93.21	222	93.16	214	91.75	93.03
Abamectin	30 ml	2688	196	92.89	229	92.18	253	91.84	221	91.08	91.99
Flufenoxuron	25 ml	2832	315	89.16	361	88.31	433	86.75	356	86.37	87.64
Super Shokrona oil	1.5 L	2837	483	83.41	537	82.64	604	81.56	501	80.85	82.22
Shokrona oil	1.5 L	2523	726	71.97	822	70.12	913	68.66	814	65.02	68.97
Check	---	2673	2744	---	2914	---	3085	---	2464	---	---

Table 5. Percenyage of rusty fruits in different treatments at Desons, Damanhour city, Behera Governorate.

Treatment	Rate/ 100 L water		Total and russeted fruits				Total	% Russeted fruits
			1	2	3	4		
Fenpyroximate	100 ml	T.	1221	1089	1140	1248	4698	0.85
		R.	14	9	8	9	40	
Abamectin	30 ml	T.	896	1061	1132	1102	4191	1.57
		R.	13	17	21	15	66	
Flufenoxuron	25 ml	T.	1226	1017	995	1314	4552	5.78
		R.	63	71	55	74	263	
Super Shokrona oil	1.5 L	T.	1137	1213	1319	1078	4747	8.87
		R.	95	124	119	83	421	
Shokrona oil	1.5 L	T.	1043	1283	943	1221	4490	15.43
		R.	176	196	140	181	693	
Check	---	T.	1121	1098	1215	1145	4579	48.46
		R.	596	614	493	516	2219	

T : Total no. of fruits per fruit trees.
R : Rusty fruits.

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دراسة تأثير بعض المبيدات على بعض الأكاروسات النباتية والمفترسة المرتبطة بأشجار الموالح

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أجريت ثلاث تجارب لتقييم فعالية مركبات فينبيروكسيمات وفلوفينوكسيورون وأبامكتيسن ونوعان من الزيوت المعدنية هما سوبر شكرونا، شكرونا ضد ثلاث أنواع من الأكاروسات التي تصيب أشجار الموالح، كما تمت دراسة الأثر الجانبي للمركبات السابق ذكرها علي الأكاروس المفترس . وقد تم اجراء التجربه الأولى فى مركز الواسطى بمحافظة بني سويف لتقييم فاعلية المركبات المختبرة ضد أكاروس الموالح البني ، أما التجربه الثانيه فقد تم تنفيذها في قرية كفر منصور بمحافظة القليوبيه لمكافحة أكاروس الموالح المبطط، والتجربة الثالثه تم اجراؤها بناحية دسونس بمركز دمنهور بمحافظة البحيرة لمكافحة أكاروس صدأ الموالح. وقد أوضحت النتائج ما يلي:

١ - يعتبر مركب فينبيروكسيمات أكثر المركبات سميه ضد كل من نوعي أكاروس الموالح البني وأكاروس الموالح المبطط يليه المركبات فلوفينوكسيورون وسوبر شكرونا من حيث الفاعليه وكان زيت الشكرونا أقل المركبات فعالية.

٢ - سبب مركبي فلوفينوكسيورون وفينبيروكسيمات أكبر نسبه خفض لتعداد الأكاروس المفترس يليه زيت سوبر شكرونا ، بينما كان زيت الشكرونا أقل المركبات تأثير علي الكثافة العددية لهذا النوع.

٣ - وجد أن مركبي فينبيروكسيمات وأبامكتين هما أكثر المواد المختبره فعالية في خفض تعداد أكاروس صدأ الموالح عن مركبات فلوفينوكسيورون ، سوبر شكرونا، شكرونا علي الترتيب.

٤ - أعطت المعامله بمركبي فينبيروكسيمات و،أبامكتين أقل نسبه مئوية لصدأ ثمار الموالح لمقارنته بغيرهما من المواد السابقة.