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CHEMICAL CONTROL OF THE RUST MITE *PHYLLOCOPTRUTA OLEIVORA* ASHMEAD, FLAT MITE *BREVIPALPUS CALIFORNICUS* BANKS AND ITS SIDE EFFECT ON *AMBLYSEIUS SCUTALIS* (ATHIAS-HENRIOT) ON CITRUS TREES.

N. G. ISKANDAR

1. Plant Protection Research Institute, Agricultural Research Centre , Dokki, Egypt.

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Abstract

Two field experiments were carried out to evaluate the effectiveness of Vertimec, Dithane M-45 and the three local mineral oils Super Shokrona, Shokrona and Star oil against the citrus flat mite, *B. californicus* and the citrus rust mite *Ph. oleivora* on Navel orange trees. The first experiment was conducted at Toukh, Qualubia Governorate to study the effect of these compounds against the flat mite and their side effects on the predatory mite *A. scutalis* (Athias - Henriot). The second experiment was conducted on the citrus rust mite collected from Kom Hafza, Damanhour district, Behera Governorate.

The results showed that Vertimec was the most toxic compound against *B. californicus* followed by Super Shokrona then Star oil. Shokrona oil however was the least toxic .

With regard to the effect on the predatory mite *A. scutalis,* Vertimec produced the highest effect , while Super Shokrona and Star oil seemed to be moderately effective. The lowest reduction in the mite population was produced by Shokrona oil.

Dithane M-45 was the most potent against *P. oleivora.* Vertimec, Super Shokrona, Star oil and Shokrona came next in a respective order.

The percentages of russeted fruits in Dithane M-45 treatment were less than any of the other treatments.

INTRODUCTION

Citrus fruits are considered as the most economically important of horticultural products in Egypt. The cultivated area of citrus has reached about 300,000 feddans.

Among pests of economic importance infesting citrus trees are mites. Infestations with these mite species are found in many localities and each species predominates in areas of favourable climatic conditions.

However , the most injurious mites in Lower Egypt are the citrus rust mite *Phyllocoptruta oleivora* Ashmead and the citrus flat mite *Brevipalpus californicus* Banks. Not only they affect the yield owing to depletion of nourishment from infested trees , but they also cause injuries to the fruits and minimize their market value (Attiah *et al.,* 1971).

With the intended increase in citrus production for export, more attention has been given in the last few years to minimize mite damage through selection of efficient pesticides. Attiah and Wahba (1971) reported that Kelthane 42% and Chlorobenzilate 50% are very efficient acaricides against the citrus flat mite.

In the present work , trials were made to evaluate on the citrus treesthe efficiency of Dithane M-45, Vertimec, and the three local mineral oils, Super Shokrona, Shokrona and Star oil, against the rust mite *Ph. oleivora*, the flat mite *B. californicus* infesting citrus trees, and their side effect on the predatory mite, *Amblyseius scutalis* (Athias - Henriot) (=*A. gossipi* El -Badry).

MARERIALS AND METHODS

Two experiments were conducted in two different localities cultivated with Navel orange trees. In both, 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 until one month after spraying. A pre-count was done before spraying to estimate the percentage reduction in mite population (Henderson and Tilton 1955).

The first experiment was conducted at Toukh County, Qualubia Governorate, on citrus trees highly infested with *B. californicus*. The experimental area included 100 trees and was divided into five treatments each contained five replicates (four trees each). Spraying had started on July 29th , 1990 and the check treatment was left unsprayed. The materials used and their rates were as follows; Vertimec (Abamectin 1.8 % E.C., natural product produced by the soil microorgansim, *Strepomyces avermitis*), at the rate of 30 cc/100 L of water . Three local mineral oils formulated as emulsifiable concentrates by the Central Agricultural Pesticides Laboratory at Dokki (Super-Shokrona 95%, shokrona 95% and star oil 95% each at the rate of 1.5 litres /100 L of water) were also tested. The differences between the previous oils include the receipe and some specifications such as unsulfonated residues. Counts of mites on each inspection date was done by reandomize picking of 5 fruits from each tree (20 fruits from each treatment).

For the predatory mite *A. scutalis* , 20 leaves were collected at random from the trees of each replicate. A total of 100 leaves from each treatment was examined for mites existing on the lower surface of the leaves.

The second experiment was performed at Kom Hafza, Damanhour County, Behera Governorate on citrus trees infested with *Ph. oleivora*. The experimental area consisted of 96 trees of Navel orange, divided into six treatments , each replicated four times and each replicate included four trees. Spraying took place on September 4th 1990. The materials used and their rates were as follows: Dithane M-45 (80%W.P., a coordination product of zinc ion and manganese ethylene bisdithiocarbamate) at the rate of 120g / 100 L of water, Vertimec 1.8% E. C. at the rate of 300cc/100 L of water , Super Shokrona 95% EC, Shokrona 95% and Star oil 95% EC each at the rate of 1.5 L /100 L of water. Counts of mites in each inspection was done at weekly intervals after spraying in the field by the aid of a hand lens. From each replicate, 8 fruits were examined (32 fruits from each treatment). At the end of the experiment, the number of russeted and healthy fruits were recorded for each treatment .

RESULTS AND DISCUSSION

Table 1 shows that Vertimec, Super Shokrona and Star oil were efficient against *B. californicus* moving stages with 83.21, 81.71 and 80.54% reduction in mite

Table 1. Effect of different chemicals against *B. californicus* (Banks) infesting Navel oranges in Toukh County , Qualubia Governorate.

Treatment	Rate/ 100 L water	No. of mites before treat. 29/7/90	No. of mite moving stages /100 fruits and percentages of reduction at indicated sampling dates								Average reduction %
			5/8/1990		12/8/1990		19/8/1990		26/8/1990		
			No.	Reduction %	No.	Reduction %	No.	Reduction %	No.	Reduction %	
Vertimec 1.8%	30 cc	1969	315	84.85	352	83.34	376	83.28	412	81.40	83.21
Super Shokrona oil	1.5 L	2021	380	81.82	379	81.38	392	82.93	419	80.71	81.71
Star oil	1.5 L	1944	402	79.80	400	80.40	415	81.52	421	80.47	80.54
Shokrona oil	1.5 L	1975	548	72.73	607	70.60	720	68.32	810	61.87	68.38
Check	--	1981	1947	---	2021	--	2250	--	2123	--	--

population, respectively . Shokrona oil seemed to be the least effective as it resulted in 68.38 % reduction in mite population. Vertimec was the most toxic compound followed by Super Shokrona then Star oil.

The side effect of these compounds on the predatory mite , *A.scutalis* is shown in Table 2. Vertimec decreased the mite population by 61.61% , while the effect of Super Shokrona and Star oils was moderate showing 31.96 and 27.31 % reduction , respectively. The lowest reduction in the population was in case of Shokrona oil . It could be concluded that Shokrona, Star and Super Shokrona oils had the least toxic effect on the predatory mite, *A. scutalis*, while Vertimec was the most toxic.

The effect of the tested compounds on *Ph. oleivora* populations are presented in Table 3. Data revealed that Dithane M-45 at the rate of 120 g/100 L of water was the most effective compound in reducing mite population (92.05%). Reduction percentages of mite population in other treatments were less than 90% (85.69, 83.27 , 82.14 and 81.27 % for Vertimec, Super Shokrona, Star oil and Shokrona oil, respectively).

Results in Table 4 Showed that percentage of russeted fruits of trees treated with Dithane M-45 was less than those of the other treatments, reaching 0.98%. The percentages of russeted fruits were 5.47, 7.7, 9.43 and 10.25 % for Vertimec Super Shokrona, Star oil and Shokrona oil , respectively, corresponding to 43.91% in the control.

These reuslts ascertained the findings of Attiah *et al.*, (1967), who stated that Zineb 72% at the rate of 150g/100 L of water was excellent against the citrus rust mite. Attiah *et al.*, (1971) demonstrated that Dithane conpounds were the best treatments against the citrus rust mite Hanna *et al.*, (1975) reported that Dithane M-45 was the most effective fungicide that reduced mite popultion and produced the highest yield of healthy fruits.

Table 2. Effect of different chemcials on the predatory mite , *A. scutalis* (A.-H.) inhabiting Navel orange trees in Tukh County, Qualubia Goverorate.

Treatment	Rate/ 100 L water	No. of mites before treat. 29/7/90	No. of mite moving stages /100 fruits and percentages of reduction at indicated sampling dates								Average reduction %
			5/8/1990		12/8/1990		19/8/1990		26/8/1990		
			No.	Reduction %	No.	Reduction %	No.	Reduction %	No.	Reduction %	
Shokrona oil	1.5 L	190	185	3.97	177	6.07	232	2.40	212	4.54	4.24
Star oil	1.5 L	222	164	27.73	158	28.29	204	27.20	191	26.04	27.31
Super Shokrona oil	1.5 L	218	150	32.68	140	35.36	188	31.20	183	28.62	31.96
Vertimec 1.8%	30 cc	219	76	66.34	81	63.64	119	56.80	108	57.86	61.16
Check	--	200	201	---	198	--	247	--	232	--	--

Table 3. Effect of different chemicals against *Ph. oleivora* on Navel orange trees in Kom Hafza, Damanhour County , Beheira Governorate.

Treatment	Rota/ 100 L water	No. of mites before treat. 4/ 9/90	No. of mite moving stages /100 fruits and percentages of reduction at indicated sampling dates								Average reduction %
			11/9/1990		18/9/1990		25/9/1990		1/10/1990		
			No.	Reduction %	No.	Reduction %	No.	Reduction %	No.	Reduction %	
Dithane M - 45	120 g	3401	232	93.19	212	94.17	344	90.90	401	85.93	92.05
Vertimec 1.8%	30 cc	3391	340	92.29	298	91.78	493	86.91	1120	71.79	85.69
Super Shokrona oil	1.5 L	3316	257	92.26	329	90.71	711	80.07	1163	70.05	83.27
Star oil	1.5 L	3542	269	92.42	366	90.33	758	80.75	1449	65.06	82.14
Shokrona oil	1.5 L	3613	283	92.18	371	90.39	836	79.18	1552	63.32	81.27
Check	--	3400	3407	---	3532	--	3779	--	3981	--	--

Table 4. Percentages of russeted fruits in different treatments in Kom Hafza, Damanhour County, Beheira Governorate.

Treatment	Rate/ 100 L water		Total and russeted fruits				Total	Russeted fruits %
			1	2	3	4		
Dithane M - 45	120 g	T	449	840	840	861	2842	0.98
		R	8	5	9	6	28	
Vertimec 1.8%	30 cc	T	876	644	711	545	2776	5.47
		R	32	46	55	19	152	
Super Shokrona oil	1.5 L	T	591	606	498	805	2500	7.76
		R	39	48	46	61	194	
Star oil	1.5 L	T	785	673	694	915	2671	9.43
		R	59	68	72	53	252	
Shokrona oil	1.5 L	T	454	517	891	763	2625	10.25
		R	75	49	82	63	269	
Check	—	T	785	643	814	593	2835	43.91
		R	364	276	395	210	1245	

T =Total no. of fruits R = Russeted fruits

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المقاومة الكيماوية لأكاروس صدأ الموالح *Phyllocoptruta oleivora* وأكاروس الموالح البني *Brevipalpus californicus* والتأثير الجانبي علي الأكاروس المفترس *Amblyseius scutalis*

نبيل جورج اسكندر

معهد بحوث وقاية النباتات -مركز البحوث الزراعية - الدقي .

أجريت تجربتين حقليتين لتقييم فاعلية مركبي الفيرتيميك والدياثين م - ٤٥ وثلاث من الزيوت المعدنية المحليه هما سوبر شكرونا وشكرونا، ستار أويل ضد نوعين من الأكاروسات التي تصيب أشجار الموالح وهما أكاروس الموالح المبطط *B. californicus* وأكاروس صدأ الموالح *Ph. oleivora*

أجريت التجربة الأولي بناحية طوخ (محافظة القليوبية علي أشجار برتقال أبوسرة مصابة بشدة بأكاروس الموالح المبطط لدراسة تأثير هذه المركبات علي الأكاروس ، كما تمت دراسة الأثر الجانبي لها علي الأكاروس المفترس *A.scutalis*.

ولدراسة تأثير هذه المركبات علي أكاروس صدأ الموالح تم اجراء التجربة الثانية علي حديقة برتقال أبو سرة بقرية كوم حفصة (مركز دمنهور - محافظة البحيرة) مصابة بشدة بهذا النوع من الأكاورسات ، كما حسبت النسبه المئوية للثمار المصابة بالصدأ في المعاملات المختلفة بالمقارنة بالثمار الغير معاملة.

وقد أوضحت النتائج مايلي:

١ - يعتبر مركب الفيرتيميك أكثر المركبات سمية ضد أكاروس الموالح المبطط ، وقد جاءت مركبات زيت سوبر شكرونا ، ستار أويل في المرتبة الثانية من حيث الفعالية و كان زيت الشكرونا أقل المركبات فعالية.

٢ - سبب مركب الفيرتيميك أكبر نسبه خفض في تعداد الأكاروس المفترس *A. scutalis* يليه سوبر شكرونا ، ستاراويل بينما كان زيت الشكرونا أقل المركبات تأثيرا علي الكثافة العددية لهذا النوع .

٣ - وجد أن مادة دياثين م - ٤٥ هي أكثر المواد المختبرة فعالية في خفض تعداد أكاروس صدأ الموالح عن مركبات الفيرتيميك ، سوبر شكرونا ، ستار اويل ، شكرونا علي الترتيب .

٤ - أعطت المعاملة بالدياثين م - ٤٥ أقل نسبة مئوية لثمار الموالح المصابة بالصدأ عند المقارنة ببقية المعاملات.