

THE ROLE OF SOME NATURAL OILS ON THE EFFICIENCY
OF MONOCROTOPHOS ON *THRIPS TABACI*
INFESTING COTTON SEEDLINGS
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Abstract

The experiment was conducted to evaluate the efficiency of monocrotophos at full (400ml/Feddan), half and quarter of the recommended rate alone and in mixures with mineral oil, (misrona and kz-oil) and natural plant oil, (cotton seed oil) against thrips, *Thrips tabaci* on cotton seedlings at Sakha, Agricultural research Station during 1997 cotton growing season. Also two natural products, milbemectin and thiocyclam hydrogen oxalate, new insecticide acetamiprid as well as mineral and plant oil alone.

The obtained results indicated insignificant differences in the efficiency of monocrotophos between the recommended rate (400 ml.), and its half and quarter rates against thrips at 2 days after spraying (initial toxicity), i.e. 95.32, 92.80 and 92.73% reduction, respectively. On the other hand, significant differences in monocrotophos efficiency in insect population were found between the low rate and the other two high rates within 2 weeks after spraying.

Adding of kz-oil, misrona and cotton seed oil to monocrotophos at the rate of 200 ml./Feddan did not contribute significantly on the insecticide the efficiency against thrips. On the contrary, the mixtures of cotton seed oil and kz-oil to monocrotophos at 100 ml./Feddan gave additive to residual effect, where it was equitoxic to the monocrotophos at 200 ml./Feddan.

Acetamiprid at 30gm. a.i./fed. caused percent reduction slightly less than monocrotophos at 200 ml./Feddan as initial or residual activity. milbemectin, cotton seed oil and kz-oil exhibited moderate initial toxicity and low residual effect. On the other hand, misrona and thiocyclam hydrogen oxalate caused weak insecticidal activity in this respect.

Key words: natural plant oil, monocrotophos, thrips, mineral oil, natural products, milbemectin, thiocyclam hydrogen oxalate, acetamiprid.

INTRODUCTION

Thrips tabaci is considered among the economic insect pests of cotton seedlings, they also attack many field crops. Such pest caused severe damage to cotton seedlings to the extent that resowing would be necessary. In such cases, the cotton mature late and may be subjected to high infestation by bollworms at the end of the season.

Chemical control is still considered one of the important methods for controlling thrips infesting cotton seedlings. Several workers have studied the effect of insecticides on this pest, i.e. Tantawy *et al.* (1979), Watson and Guirguis (1979), Kassem *et al.* (1981 and 1988) and Halawa *et al.* (1990 and 1992).

The aim of the present investigation was to evaluate the effectiveness of low rates of some insecticides on the population density of thrips infesting cotton seedlings.

MATERIALS AND METHODS

The present investigation was carried out during 1997 cotton growing season at Sakha Agricultural Research Station. An experimental area of about one feddan was divided into 68 plots in a complete randomized block design. Four replicates (42 m²/each) was used for each treatment including the untreated control. Samples of 100 cotton seedlings were picked up at random before spray and after 2,5,8,11 and 14 days from application for population counts. Reduction in population was computed according to the equation of Henderson and Tilton (1955). Statistical analysis was carried out by using the Chi-square method.

Tested Compounds

Insecticides: Azodrin 40% SCW (monocrotophos): O,O-Dimethyl-o- (2-methylcarbamoyl-1-methyl-vinyl) phosphate. Ni 25 25% WP and 3% EC (acetamiprid): (E)-N- (6-chloro-3 pyridyl) methyl)-N-cyano-N-methylacetamide. Evisect-S 50% WP: (thiocyclam hydrogen oxalate) a natural product from the marine annelid worm *lumbrinereis* spp. N,N-dimethyl-1,2,3-trithian-5-ylamine hydrogen-oxalate. CM-006 1% EC (milbemectin) a natural product from the soil microorganism *Streptomyces hygroscopicus*.

Natural Materials: cotton seed oil and Misrona-Kz-oil.

The formulated pesticides were diluted with water (200 liters/feddan) and sprayed on cotton seedlings by using Cp-3 sprayer fitted with one nozzle.

RESULTS AND DISCUSSION

Data presented in Tables 1 and 2 elucidate the effect of monocrotophos at the recommended rate (400 ml.), its half and quarter rates alone and its mixures with mineral oil (kz-oil and misrona) and natural plant oil (cotton seed oil). Also, two natural products milbemectin, thiocyclam hydrogen oxalate, new insecticide acetamiprid, cotton seed oil, kz-oil and misrona against thrips, *Thrips tabaci* on cotton seedlings. Data indicate that, all tested compounds except of cotton seed oil, thiocyclam hydrogen oxalate and misrona exhibited a high percent reduction in thrips population after 2 days (initial kill), i.e. ranged from 83.03 to 95.32%.

As for the residual activity of the tested compounds in cotton field, data indicate that, the longer the time of exposure was the lower the reduction in thrips population and vice versa. This was more pronounced with thiocyclam hydrogen oxalate (74.03 - 0.00), misrona (72.20-0.00), monocrotophos 100 ml+ misrona (86.48-8.23), kz-oil (83.21-11.86) and monocrotophos 100 ml.(92.73-16.74% reduction) at 2 and 14 days after spraying, respectively.

Data showed that the mean of residual effect of monocrotophos 400 ml., monocrotophos 100 ml. + kz-oil, monocrotophos 200 ml., monocrotophos 200 ml. + kz-oil and monocrotophos 200 ml. + cotton seed oil, remained highly effective after 14 days of application, recording 75.15, 67.31, 63.04 and 60.13% reduction, respectively in thrips population. On the other hand, thiocyclam hydrogen oxalate, misrona and monocrotophos 100 ml. + misrona were the lowest effective which gave 24.27, 31.73 and 38.01% reduction, respectively.

Data, in the same tables indicated insignificant differences in the efficiency of monocrotophos when used at the three rates against thrips at 2 days after spraying, showing 95.32, 92.80 and 92.73% reduction with 400, 200 and 100 ml./Feddan, respectively. On the other hand, significant differences between the lowest rate (100 ml./Fed.) and the higher rates during 5 to 14 day after spraying were noticed. Similar results were reported by Kassem *et al.* (1981 & 1988) and Halawa *et al.* (1990 & 1992).

Adding of kz-oil, misrona and cotton seed oil to monocrotophos at 200 ml./fed. did not increase significantly the efficiency of these compounds against thrips.

While adding of misrona to monocrotophos at 100 ml.decreased its residual activity.

Data also indicate that, the two formulation of acetamiprid induced equitoxic against thrips as initial or residual activity at 30 gm.a.i/fed. Acetamiprid 20% Wp. at 150 gm./Fed. and acetamiprid Ec at 1000 ml./fed caused percent reduction slightly less than monocrotophos at 200 ml./fed as initial or residual efficacy, recording 89.60 and 88.08% reduction.

Data in the same tables indicate that, cotton seed oil and mineral oil (misrona and kz-oil) at 2L/fed. exhibited moderate initial toxicity and low residual effect.

A weak initial and residual activity were observed with thiocyclam hydrogen oxalate showing percent reduction of 74.03 and 24.27% ad initial and residual activity, respectively. On the other hand, milbemectin caused a moderate effect in this respect, i.e. 83.03 and 47.76%, respectively.

These results are in agreement with those obtained by moustafa and El-Attab (1985) who reported that, the mineral oil used alone significantly reduced the adult population of *Thrips tabaci* on cotton, but oil insecticide combinations were superior to oil or insecticides applied alone. Halawa *et al.* (1992) found that, mineral oil induced a good initial and residual toxicity against *Thrips tabaci*.

Table 1. Number of thrips per 100 cotton seedlings as influenced by tested compounds.

Compounds Used	Rate/Fed	Rate/Fed	Number of thrips population at indicated days after spraying				
			2	5	8	11	14
Monocrotophos 40% Scw	400 ml.	1244	39	120	189	102	135
Monocrotophos 40% Scw	200 ml.	1430	69	201	252	203	234
Monocrotophos 40% Scw	100 ml.	1211	59	228	315	239	333
Monocrotophos 40% Scw + Cotton seed oil + Tween	200 ml + 2L. + 10 ml.	1445	63	249	270	221	252
Monocrotophos 40% Scw + Cotton seed oil + Tween	100 ml. + 2L. + 10 ml.	1294	116	276	288	187	249
Cotton seed oil + Tween	2L. + 10 ml.	1255	152	255	279	221	261
Monocrotophos 40% Scw + misirona	200 ml + 2L.	1461	93	255	270	225	279
Monocrotophos 40% Scw + misirona	100 ml + 2L.	1158	105	309	342	238	351
Misirona	2L.	1197	183	351	405	267	396
Monocrotophos 40% Scw + Kz-oil	200 ml + 2L.	1179	76	144	225	171	197
Monocrotophos 40% Scw + Kz-oil	100 ml + 2L.	1306	99	195	207	153	189
Kz-oil	2L.	1350	152	264	216	323	393
Milbemectin 1% Ec	200 ml.	1116	127	327	297	204	225
Acetamiprid 20% wp	150 gm	1362	95	228	216	207	270
Acetamiprid 3% Ec	1000 ml.	1301	104	288	306	188	234
Thiocyclam hydrogen oxalate 50% WP	500 gm	1361	237	293	477	546	711
Untreated control	-	1308	577	864	774	408	432

Table 2. Percent reduction of thrips population infesting cotton plants following the application of tested compounds.

Compounds Used	Rate/Fed	% Reduction in thrips population at the indicated days after spraying					Mean of residual effect
		2	5	8	11	14	
Monocrotophos 40% Scw	400 ml.	95.32a	85.40	74.33	73.71	67.14	75.15a
Monocrotophos 40% Scw	200 ml.	92.80ab	78.72	70.22	54.49	50.45	63.47ab
Monocrotophos 40% Scw	100 ml.	92.73abc	71.50	56.04	36.73	16.74	45.25bcde
Monocrotophos 40% Scw + Cotton seed oil + Tween	200 ml + 2L. + 10 ml.	93.50ab	73.91	68.52	50.97	47.20	60.13abc
Monocrotophos 40% Scw + Cotton seed oil + Tween	100 ml. + 2L. + 10 ml.	86.63abcd	67.71	62.39	53.67	41.74	56.38abcd
Cotton seed oil + Tween	2L. + 10 ml.	81.94bcd	69.24	62.43	43.55	37.03	53.06abcd
Monocrotophos 40% Scw + misrona	200 ml + 2L.	90.51abc	73.58	68.77	50.63	42.18	58.79abc
Monocrotophos 40% Scw + misrona	100 ml + 2L.	86.48abcd	59.60	50.09	34.11	8.23	38.01def
Misrona	2L.	77.20cd	55.61	42.82	28.49	0.00	31.73ef
Monocrotophos 40% Scw + Kz-oil	200 ml + 2L.	90.39abc	81.51	67.75	53.50	49.41	63.04ab
Monocrotophos 40% Scw + Kz-oil	100 ml + 2L.	88.69abcd	77.40	73.21	62.44	56.18	67.31ab
Kz-oil	2L.	83.21abcd	70.40	72.96	23.30	11.86	44.63cde
Milbemectin 1% Ec	200 ml.	83.03abcd	55.64	55.03	41.40	38.96	47.76bcde
Acetamiprid 20% wp	150 gm	89.60abc	74.66	73.20	51.28	39.96	59.78abc
Acetamiprid 3% Ec	1000 ml.	88.08abcd	66.49	60.25	53.67	45.54	56.49abcd
Thiocyclam hydrogen oxalate 50% Wp	500 gm	74.03d	56.29	40.77	0.00	0.00	24.27f
Untreated control	-						

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دور بعض الزيوت الطبيعية علي كفاءة مركب مونوكروتوفوس علي التربس الذي يصيب بادرات القطن

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نفذت هذه التجربة بمحطة البحوث الزراعية بسخا موسم ١٩٩٧ بغرض تقييم كفاءة مركب مونوكروتوفوس عند إستخدام ثلاث معدلات تطبيق مختلفة وهي المعدل الموصي به (٤٠٠ سم^٢ / فدان) ونصف المعدل ثم ربع المعدل. كما تم إختبار دور الزيوت المعدنية والنباتية علي كفاءة التركيزات المنخفضة من مركب مونوكروتوفوس بالإضافة إلي إختبار كفاءة بعض المركبات الطبيعية المستخلصة من الكائنات الدقيقة للتربة وهي مركب ثيو سيكلام هيدروجين أوكسلات (إفيسكت)، ميلبمكتين ، أسيتامبيرد حديث الانتاج وكذلك تم إختبار كفاءة الزيوت المعدنية والنباتية منفردة. ولقد تم تقييم كفاءة هذه المعاملات علي تعداد التربس علي بادرات القطن وأوضحت النتائج المتحصل عليها مايلي:

- عدم وجود فروق معنوية بين كفاءة المعدلات الثلاثة المختبرة لمركب مونوكروتوفوس علي خفض تعداد التربس وذلك بعد يومين (التأثير الفوري) ولكن من ناحية أخرى وجدت فروق معنوية بين كفاءة المعدل (١٠٠ سم^٢ / فدان) بالمقارنة الأعلى علي تعداد التربس وذلك علي فترات ٨.٥ ، ١٤ يوما بعد الرش (الأثر الباقي).

- وبالنسبة لتأثير إضافة الزيوت المعدنية والطبيعية إلي المعدلات المنخفضة من مركب مونوكروتوفوس فقد أظهرت النتائج أن إضافة أي من زيت كزذ ومصرونا وزيت بذرة القطن إلي مركب مونوكروتوفوس بمعدل (٢٠٠ سم^٢ / فدان) لم يظهر زيادة معنوية علي كفاءة هذا المعدل علي خفض تعداد التربس ، لكن علي العكس من ذلك فإن إضافة أي من الزيت المعدني كزذ أو المستخلص النباتي (زيت بذرة القطن) إلي المعدل (١٠٠ سم^٢ / فدان) من مركب مونوكروتوفوس فإنه قد أعطي زيادة في التأثير المتبقي لهذا المعدل تعادل تقريبا التأثير المتبقي للمعدل (٢٠٠ سم^٢ / فدان).

- من ناحية أخرى فإن إستخدام المركب أسيتا ميبرد بمعدل ٣٠ جرام مادة فعالة للفدان قد أحدث إنخفاض في التعداد أقل بنسبة ضئيلة عن مونوكروتوفوس (بمعدل ٢٠٠ سم^٢ / فدان) وذلك في حالة التأثير الأولي أو المتبقي. كذلك فقد أظهر كل من مركب ميلبمكتين و زيت بذرة القطن والزيت المعدني كزذ سمية أولية متوسطة وسمية متبقية منخفضة ، كما أعطي كل من مركب مصرونا وثيوسيكلام هيدروجين أوكسلات تأثير أولي ضعيف وأيضا تأثير متبقي منخفض.