

Comparative Efficacy of Granular and EC Formulated Insecticides for the Economic Control of *Thrips tabaci* Lindeman in Garlic Crop

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ABSTRACT

Efficacy and economics of insecticides was studied in 3-year trial against *Thrips tabaci*. Granular insecticides viz. phorate 10 G @ 15 kg/ha (ICBR 1 : 1.24) and carbofuran 3 G @ 50 kg/ha (ICBR 1 : 1.07) alone, and followed by the recommended EC formulated insecticides, dimethoate 0.03 per cent (ICBR 1 : 2.63 and 1 : 1.42) and endosulfan 0.7 per cent (ICBR 1 : 1.35 and 1 : 1.43) were not found effective and economical as compared to foliar spray of dimethoate 0.03 per cent (ICBR 1 : 6.99) and endosulfan (ICBR 1 : 4.67) for the control of thrips in garlic.

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INTRODUCTION

Garlic is an important spices crop mainly cultivated in South Saurashtra (Gujarat) as a more profitable *rabi* crop. The pest, *Thrips tabaci* Lind. is responsible for low yield and poor quality of bulbs. The foliar application of the some insecticides has been recommended against this pest on garlic (Anonymous, 1991, Mittal and Butani, 1994, Bharadwaj *et al.* 1990). Little information regarding effectiveness of granular insecticides in comparison to the EC formulated insecticides is available (Anonymous, 1991 and Changela, 1993). The present study was, therefore, undertaken to compare the economics of granular and EC formulated insecticides against thrips attacking garlic.

MATERIALS AND METHODS

A field experiment was laid out at the University Campus, Junagadh for three consecutive years (1993-94) in complete randomized block design with eight treatments and 4 replications. Out of eight treatment, two granular insecticides (Table 1) were applied alone in soil at the sowing time, and were followed by the applications of two recommended EC formulated insecticides (Table 1) and alone also. Spraying of the EC formulated insecticides were carried out at the one month interval starting from the thrip infestation. Number of thrips was counted on three leaves (Top, middle and bottom) of each five randomly selected plants from each plot before 24 hr and after 48 hr of spraying. The incremental cost benefit ratio (ICBR) was

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TABLE 1

Efficacy of the recommended and granular insecticides for control of thrips attacking garlic.

Sr. No.	Treatment	Before spray*				After 48 hrs of spraying*			
		1993-94	1994-95	1995-96	Pooled	1993-94	1994-95	1995-96	Pooled
1.	Phorate 10 G	3.70** (13.19)	4.14 (16.64)	4.99 (24.45)	4.28 (17.79)	2.78 (7.23)	2.20 (4.61)	2.17 (4.21)	2.38 (5.18)
2.	Carbofuran 3 G	3.35 (11.96)	3.82 (14.09)	5.05 (25.08)	4.13 (16.58)	2.23 (4.47)	1.71 (2.42)	2.01 (3.54)	1.98 (3.43)
3.	Phorate 10 G + endosulfan 0.07%	3.60 (12.46)	4.20 (17.14)	5.17 (26.25)	4.32 (18.19)	2.12 (3.99)	1.83 (2.85)	1.54 (1.87)	1.83 (2.85)
4.	Phorate 10 G + dimethoate 0.03%	3.55 (12.10)	3.94 (12.02)	5.04 (24.91)	4.18 (16.94)	2.27 (4.65)	1.74 (2.53)	1.59 (2.03)	1.87 (2.98)
5.	Carbofuran 3 G + endosulfan 0.07%	3.72 (13.34)	4.09 (16.23)	5.11 (25.64)	4.31 (18.05)	2.03 (3.62)	1.65 (2.22)	1.91 (3.15)	1.86 (2.97)
6.	Carbofuran 3 G + dimethoate 0.03%	3.64 (12.75)	4.09 (16.23)	5.17 (26.23)	4.30 (17.99)	2.08 (3.83)	1.95 (3.30)	1.59 (2.03)	1.87 (3.01)
7.	Endosulfan 0.07%	3.66 (12.90)	4.03 (15.74)	5.05 (25.08)	4.25 (17.53)	1.90 (3.11)	1.43 (1.54)	1.51 (1.78)	1.61 (2.10)
8.	Dimethoate 0.03%	3.59 (12.39)	4.07 (16.06)	5.22 (26.75)	4.29 (17.93)	2.09 (3.87)	1.47 (1.66)	1.29 (1.16)	1.62 (2.11)
9.	Control (Untreated)	3.58 (12.32)	4.05 (15.90)	5.24 (26.98)	4.29 (17.90)	3.59 (12.39)	4.04 (15.82)	5.43 (28.98)	4.35 (18.45)
	S. Em. for treat	0.047	0.109	0.089	0.100	0.160	0.084	0.070	0.097
	—, — year	—	—	—	0.058	—	—	—	0.049
	—, — treat x year	—	—	—	0.087	—	—	—	0.079
	C. D. at 5% for treat	NS	NS	NS	NS	0.048	0.243	0.204	0.283
	—, — year	—	—	—	0.169	—	—	—	1.142
	—, — treat x year	—	—	—	NS	—	—	—	0.231
	C. V%	2.621	5.411	3.541	4.066	14.17	8.325	5.66	6.402

* No. of thrips per leaf, ** $\sqrt{x + 0.5}$ transformation values *** Figures in parenthesis are retransformed values.

(+) = followed by spray.

worked by calculating the net realization over control and cost of treatments.

RESULTS AND DISCUSSION

(a) Efficacy of different insecticides on population on thrips

Pooled data (Table 1) showed that all the insecticides were found significant in reducing the pest over control. The lowest population was recorded in endosulfan 0.07 per cent (2.10 thrips/leaf) which was at par with dimethoate 0.03 per cent (2.11/leaf), phorate 10 G followed by spraying of endosulfan (2.85 thrips/leaf), carbofuran 3 G followed by spraying of endosulfan (2.97 thrips/leaf), phorate followed by spraying of dimethoate (2.95 thrips/leaf) and carbofuran followed by spraying of dimethoate (2.95

thrips/leaf). The next treatment was carbofuran (3.43 thrips/leaf) and followed by phorate was third ranked (5.18 thrips/leaf).

(b) Yield

Pooled data (Table 2) showed that all the treatments significantly increased the yield over control except the treatment of phorate (6159 kg/ha). The highest yield (7197 kg/ha) was obtained in carbofuran followed by endosulfan which was at par with carbofuran followed by spraying of dimethoate (7067 kg/ha), endosulfan (6835 kg/ha), dimethoate (6737 kg/ha), carbofuran (6601 kg/ha), phorate followed by endosulfan (6476 kg/ha) and phorate followed by dimethoate (6471 kg/ha).

TABLE 2

Effect of the recommended and granular insecticides on yield of garlic bulbs.

Sr. No.	Treatment	Yield/kg/ha			Pooled kg/ha
		1993-94	1994-95	1995-96	
1.	Phorate 10 G	8775	4836	4867	6159
2.	Carbofuran 3 G	9453	5188	5164	6601
3.	Phorate 10 G + Endosulfan 0.07%	9218	4891	5320	6476
4.	Phorate 10 G + dimethoate 0.03%	9015	4906	5492	6471
5.	Carbofuran 3 G + dimethoate 0.03%	10046	5500	5656	7067
6.	Carbofuran 3 G + endosulfan 0.07%	10343	5656	5593	7197
7.	Endosulfan 0.07%	10046	5109	5351	6835
8.	Dimethoate 0.03%	9765	5016	5425	6737
9.	Control	8593	4274	4640	5836
	S. Em. for treat	225	208.750	106.250	274.375
	—, — year	—	—	—	137.500
	—, — t x y	—	—	—	224.375
	C.D. at 5% for treat	655	583.780	309.375	798.125
	—, — year	—	—	—	399.375
	—, — t x y	—	—	—	N.S.
	C. V.%	4.757	8.279	4.032	5.881

(+) = followed by spray.

TABLE 3

Economics of the recommended and granular insecticides for control of garlic thrips & ICBR.

Sr. No.	Treatment	Total quantity of insecticides lit./kg/ha	Cost of insecticides Rs/ha	Labour charges (Rs.)	Yield kg/ha	Gross realization Rs/ha	Net realization over control Rs/ha	Cost of treatments Rs/ha	ICBR
1.	Phorate 10 G alone	15 kg	825	90	6159	21557	1131	915	1 : 1.24
2.	Carbofuran 3 G alone	50 kg	2500	90	6601	23104	2678	2590	1 : 1.07
3.	Phorate 10 G + endosulfan 0.07%	15 kg + 2.710 lit.	1394	270	6476	22666	2240	1664	1 : 1.35
4.	Phorate 10 G + dimethoate 0.03%	15 kg + 1.355	1096	270	6471	22649	2223	1366	1 : 1.63
5.	Carbofuran 3 G + endosulfan 0.07%	50 kg + 2.710 lit.	3069	270	7197	25190	4764	3339	1 : 1.43
6.	Carbofuran 3 G + dimethoate 0.03%	50 kg + 1.355 lit.	2271	270	7067	24735	4309	3041	1 : 1.42
7.	Endosulfan 0.07%	2.710 lit.	569	180	6835	23922	3497	749	1 : 4.67
8.	Dimethoate 0.03%	1.355 lit.	271	180	6737	23580	3154	451	1 : 6.99
9.	Control (Untreated)	—	—	—	5836	20426	—	—	—

1. Market price of garlic bulb was calculated as 3.50 Rs./1 kg.
2. Granular insecticides applied once were followed by two sprays of the respective insecticides.
3. Spray solution was used as 625 lit./hectare in first spray and 730 lit./hectare in second spray.
4. Labour charges was calculated as Rs. 30/- labour.

(c) Economics of Insecticidal treatments

The highest ICBR was recorded in dimethoate (1 : 6.99), followed by endosulfan (1 : 4.67), phorate followed by dimethoate (1 : 1.63), carbofuran followed by endosulfan (1 : 1.43), carbofuran followed by dimethoate (1 : 1.35), phorate (1 : 1.24) and carbofuran (1 : 1.7).

Bharadwaj *et al.* (1990) reported cypermethrin as the most effective insecticide, followed by malathion and quinalphos, Mittal and Butani. (1994) found quinalphos,

endosulfan and dimethoate as the most effective insecticides. The efficacy of different insecticides including the granular insecticides were studied by Anonymous (1991) and Changela (1993). They reported the granular insecticides viz., phorate and carbofuran were less effective. These reports support the findings of the present investigation.

The study concluded that the foliar application of EC formulated insecticides proved effective and economical compared to the granular chemicals for the control of thrips infesting garlic.

REFERENCES

- Anonymous, 1991. Effect of different systemic and non systemic insecticides on the control of garlic thrips. Associated Agril. Develop. Foundation, Nasik, Annual Report, pp. 45.
- Bharadwaj, B. S., Gupta, R. P., Srivastava, P. K. and Srivastava, J. K. 1990. Effect of different systemic and non systemic insecticides on the control of garlic thrips. Associated Agril. Develop. Foundation, Nasik, Annual Report pp. 126-127.
- Changela, N. B. 1993. Bionomic population dynamics and chemical control of thrips (*Thrips tabaci* Lindeman) on garlic. M.Sc. Thesis submitted to Gujarat Agril. University.
- Mittal, V. P. and Butani, P. G. 1994. Insecticidal control of garlic thrips (*Thrips tabaci* Lind.) under Gujarat conditions. In Bioecology and Control of Insect Pest : Proceed. Nal. Symp. on Growth Development and Control Tech. of Insect Pests. Muzaffarnagar, India, U.P. Zoological Soc., pp. 161-169.