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Biological Assessment of Trizophos Sprayed Aerially Against Sugarcane Whitefly

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ABSTRACT

Four doses of triazophos 40 EC (Hostathion) and other conventional insecticides were tested by aerial spraying during October 1991 in Chalthan sugar factory area of Gujarat State (India) to work out their efficacy against sugarcane whitefly *Aleurolobus barodensis*. The results indicated that triazophos 40 EC at dose of 593 g a.i./ha was the best treatment which exhibited the highest ovicidal effect.

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INTRODUCTION

The whitefly, *Aleurolobus barodensis* Mask is a serious insect pest of sugarcane in South Gujarat since last five years. Both nymphs and adults of this pest suck cell sap from the under surface of the leaves. The affected crop becomes pale green to yellow and look sick in appearance. As a result, cane juice as well as jaggary quality are badly affected. There is also a loss in sugar recovery (Singh *et al.* 1956; Siddiqui and Saxena, 1960). Various insecticides have been tested by ground application for the control of this pest on sugarcane in India (Chandhary *et al.* 1988) Patel *et al.* 1989 and Kunjadia and Patel (1993). However, ground spraying of insecticides is very difficult in later stage of the crop. Looking to this fact, aerial spraying trial was conducted during 1991 to test the bioefficacy of triazophos alongwith other insecticides against sugarcane whitefly.

MATERIALS AND METHODS

Nine individual plots (each approximately of 8-10 acres) of sugarcane reasonably isolated from each other, located in Chalthan sugar factory area were selected for treatments. Each plot was divided into three blocks considering one block as one replication. Ten plants were randomly selected from each replication and from each plant, three leaves, each in the top, middle and lower portion of the plant were selected, plucked and brought to the laboratory for recording whitefly population. On each leaf, three spots of 24 cm^2 (8 cm x 3 cm) area each in top, middle and basal portion were observed under

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microscops for whitefly population (nymph and puparia). Number of whitefly nymph/puparia were recorded before spraying as well as 3, 7, 14 and 21 days of aerial spraying. To study the ovicidal effect of insecticides, ten top leaves having whitefly eggs were selected randomly from each replication and tagged. These tagged leaves were brought into the laboratory and observation were recorded on per cent egg hatching by examining them under microscope. Based on these data the ovicidal effect was worked out in terms of per cent reduction in hatching.

The insecticides *viz.*; triazophos, endosulfan, dimethoate and ethion were sprayed aerially with a VT-EAD helicopter having D-4 type 44 duromist nozzle under the pump pressure of 65 P.S.I. Spraying operation was done during 10.0 to 11.30 a.m. in calm wind condition. The helicopter effected 30.5 meter swath width while flying at 2.5 to 3 meter above the crop canopy. Insecticidal spray mixture was applied @ 21.25 lit/ha.

The data on whitefly population counts have been analysed adopting randomized block design after following root transformation while the data on per cent reduction in hatching have been analysed with the same design after following arc sin transformation. The data on whitefly population have also been pooled over days.

RESULTS AND DISCUSSION

From the table 1, it can be seen that the differences in whitefly population in all the treatments was non-significant before spraying showing the population of whitefly as homogenous in the initial stage of the experiment. Further, all the insecticidal treatments recorded significantly lower population than control treatment in each observation after spraying.

The data recorded on 3 days after spraying (DAS) revealed that triazophos 593 g a.i/ha (3.06 nymph/puparia) was found to be significantly superior over others in controlling the whitefly. Similarly on 7 DAS, the treatments of triazophos 593 g a.i./ha (6.45 nymphs/puparia), triazophos 494 g a.i./ha (8.76) and endosulfan 432 g a.i./ha (10.63) were found to be at par with each other and significantly superior to rest of the treatments. On 14 DAS, triazophos 593 g a.i./ha (44.22) was at par with 494 g a.i./ha (56.70) but significantly superior to rest of the treatments. On 21 DAS triazophos 593 g a.i./ha (23.62) was found to be significantly superior to rest of the treatments. Further, the treatments of triazophos 395 g and 495 g a.i./ha were found at par with each other and superior to rest of the treatments.

The ANOVA of pooled analysis of data on number of whitefly nymph/puparia over days revealed that the interaction (D x T) was non-significant indicating consistant behaviour of different treatments during individual observations. Further, all the treatments differed significantly from each other. The pooled data revealed that triazophos 593 g a.i./ha was found to be significantly superior to rest of the treatments. The effectiveness of rest of the treatments in descending order was triazophos 494 g a.i./ha (26.11), triazophos 395 g a.i./ha (32.95), triazophos 296 g a.i./ha (43.96), endosulfan 432 g a.i./ha + dimethoate 371 g a.i./ha (55.50), ethion 371 g a.i./ha (70.90), endosulfan 432 g a.i./ha (76.74), dimethoate

Mean population of whitefly (nymph/puparia) population per 72 cm² leaf area.

Sr. No.	Treatments	Dose a.i./ ha. (ml.)	Before Spraying	Days after spraying				Pooled
				3	5	14	21	
1.	Triazophos (Hostathion 40 EC)	296 ml	154.26 (12.42)	14.90 (3.86)^{c}	22.56 (4.75)^{b}	76.74 (8.76)^{b}	83.91 (9.61)^{c}	43.96 (6.63)^{d}
2.	Traizophos (Hostathion 40 EC)	395 ml	134.10 (11.58)	9.30 (3.05)^{b}	22.18 (4.71)^{b}	73.10 (8.55)^{b}	44.22 (6.65)^{b}	32.95 (5.74)^{c}
3.	Triazophos (Hostathion 40 EC)	494 ml	121.88 (11.04)	9.99 (3.16)^{b}	8.76 (2.96)^{a}	56.70 (7.53)^{ab}	46.24 (6.80)^{b}	26.11 (5.11)^{b}
4.	Triazophos (Hostathion 40 EC)	593 ml	148.60 (12.19)	3.06 (1.75)^{a}	6.45 (2.54)^{a}	44.22 (6.65)^{a}	23.62 (4.86)^{a}	15.60 (3.95)^{a}
5.	Endosulfan (Thiodan 35 EC)	432 ml	121.66 (11.03)	23.81 (4.88)^{d}	10.63 (3.26)^{a}	221.12 (14.87)^{e}	144.00 (12.00)^{a}	76.74 (8.76)^{g}
6.	Endosulfan + Dimethoate	432 ml 371 ml	167.96 (12.96)	12.26 (3.50)^{bc}	22.66 (4.76)^{b}	109.41 (10.46)^{c}	122.99 (11.09)^{de}	55.50 (7.45)^{e}
7.	Dimethoate (Rogor 30 EC)	371 ml	146.89 (12.12)	24.70 (4.97)^{d}	33.18 (5.76)^{c}	210.25 (15.50)^{e}	99.80 (9.99)^{cc}	82.08 (9.06)^{h}
8.	Ethion (E-mite 30 EC)	371 ml	145.44 (12.06)	20.98 (4.58)^{d}	38.07 (6.17)^{c}	169.00 (13.00)^{d}	98.60 (9.93)^{cc}	70.90 (9.06)^{h}
9.	Control		141.85 (11.91)	120.12 (10.96)^{e}	152.28 (12.34)^{d}	295.15 (17.18)^{f}	254.40 (15.95)^{f}	198.81 (14.10)^{i}
	S. Em. ±		(0.51)	(0.23)	(0.30)	(0.55)	(0.50)^{T} (0.17)	D Interaction (0.11) (0.34)
	C. D. at 5% level of significance		NS	(0.57)	(0.74)	(1.36)	(1.23) (0.26)	– MS.
	C. V. %		(10.52)	(8.85)	(9.89)	(8.35)	(9.07) (7.69)	- -

* Figure in the parentheses are $\sqrt{x}$ transformed values those outside the parentheses are retransformed value.

** Figures with same latter did not differ significantly.

371 g a.i./ha (82.08) and control (198.81). Kunjadia and Patel (1993) have tested various insecticides against sugarcane whitefly by ground application and found triazophos 0.1% to be the most effective treatment in controlling all stages of sugarcane whitefly. Similarly, Patel *et al.* (1989) reported that the treatments of triazophos 0.1% and 0.05% could keep comparatively lower population of sugarcane whitefly (nymph) upto 21 days of spraying. Thus, the present findings are in close confirmation with the findings of above workers.

The perusal of data on the per cent reduction in hatching of eggs (ovicidal effect) presented in Table-2 indicated that all the insecticidal treatments except ethion 371 g a.i./ha were found to be significantly superior to control. The treatments of triazophos 593 g

TABLE 2

Ovicidal effect of various insecticides.

Sr. No.	*Treatments*	*Dose a.i./ha (ml.)*	*reduction in egg hatching(%)*
1.	Triazophos (Hostathion 40 EC)	296 ml	23.93 (29.29*)^{c}
2.	Triazophos (Hostathion 40 EC)	395 ml	34.39 (36.24)^{b}
3.	Triazophos (Hostathion 40 EC)	494 ml	41.75 (40.25)^{ab}
4.	Triazophos (Hostathion 40 EC)	593 ml	46.01 (42.71)^{a}
5.	Endosulfan (Thiodan 35 EC)	432 ml	21.69 (27.76)^{c}
6.	Endosulfan +	432 ml	22.40
7.	Dimethoate	371 ml	(28.25)^{c}
7.	Dimethoate (Rogar 30 EC)	371 ml	17.46 (24.60)^{c}
8.	Ethion (E-mite 30 EC)	371 ml	10.31 (18.73)^{d}
9.	Control		7.89 (16.31)^{d}
	S. Em. ±		(1.91)
	C. D. at 5% level of significance		(4.76)
	C. V. %		(11.28)

* Figure in the parentheses are arc sin transformed values while those outside parentheses are retransformed values.

** Figures with same letter did not differ significantly.

a.i./ha exhibited highest ovicidal effect (46.01%) and was significantly superior to rest of the insecticidal treatments except triazophos 494 g a.i./ha (41.75%). The order of effectiveness of rest of the treatments was triazophos 395 g a.i./ha (34.39%) > triazophos 296 g a.i./ha (23.93%) > endosulfan 432 g a.i./ha + dimethoate 371 g a.i./ha (22.40%) > endosulfan 432 g a.i./ha (21.69%) > dimethoate 371 g a.i./ha (17.46) > ethion 371 g a.i./ha (10.31%). The ovicidal action of triazophos has been reported on sugarcane whitefly, *Aleurolobus barodensis* at 0.1% concentration (Kunjadia and Patel 1993). Similar results were obtained with triazophos 0.1% and 0.05% by Patel *et al.* (1989).

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