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Evaluation of Some Dust Formulations of Insecticides Against Safflower Aphid *Uroleucon compositae* Theobald

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ABSTRACT

Field experiment was conducted during *rabi* 1991-92 to 1993-94 at Gujarat Agricultural University, Campus Anand to find out the effective and economical insecticide dust formulation against aphid, *Uroleucon compositae* Theobald infesting safflower. Two need base dusting of methyl parathion 2% dust at 15 or more aphids per 100 cm long safflower twig gave effective control of aphid and recorded highest (1 : 5.48) cost : benefit ratio for management of safflower aphids.

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INTRODUCTION

Safflower, *Carthamus tinctorius* (Linn.) is one of the major rainfed rabi oilseed crops cultivated in India on an area of 8.60 lakh hectares with an annual production of 4.91 lakh tonnes (Anonymous, 1991). Among the various factors affecting the yields, insects are the major bottle neck. The safflower aphid, *U. compositae* is the most serious pest amongst twenty two pests recorded in India (Rai, 1976). Nymphs and adults suck cell sap from tender shoots and leaves and impair vitality of plant and causing an yield loss from 36.05 to 67.72 per cent (Bhumnnavar and Thontadarya, 1979; Basavanagoud *et al.*, 1981). In india various E.C. formulations of insecticides have been tested for their bio-efficacy against *U. compositae* by various workers, but no information on bio-efficacy of new dust fromulations is available, keeping this in view the present study was carried out.

MATERIALS AND METHODS

A field experiment was conducted at Anand in *rabi* 1991-92 to 1993-94 to evaluate the bio-efficacy and economics of five dust formulation of insecticides against safflower aphid, *U. compositae* (Table 1) with four replications. The gross and net plot size was 5.0 x 4.5 m and 4.0 x 3.6 m respectively. A distance of 45 cm between the rows and 10 cm between the plants was maintained.

The aphid population was recorded regularly at weekly interval from the appearance of aphid on randomly selected 10 apical twigs of 10 cm length in each plot. The first dusting of each of the insecticides was

lone @ 25 kg/ha when aphid, *U. compositae* opulation reached 15 or more aphids per 10 m twig (Rathore and Pathak, 1982). The post reatment aphid populations were recorded fter 24th, 48th, 72th and two weeks of lusting. Second dusting of all the dusts was lone after three weeks of first dusting. The lata obtained on aphid population after square oot transformation and yield were analysed tatistically.

RESULTS AND DISCUSSION

The significant effectiveness of all the lust formulations against safflower aphid, *U. ompositae* was observed till two weeks after first and second dusting over the untreated control. However, after first dusting no significant difference was observed in any of the dust formulations except endosulfan 2% dust which remained least effective after 24th of application. Methyl Parathion 2% dust proved more effective against aphid than endosulfan 2% dust after 48 and 72h of dusting. Fenvalerate 0.4% dust remained equally effective as endosulfan 4% dust upto one week, whereas after two weeks fenvalerate 0.4% dust was found less effective and high aphid population was observed on safflower crop in comparision to endosulfan 4% dust. Carbaryl 5% dust, methyl parathion

TABLE 1

Effect of various dust formulations on safflower aphid, *U. compositae* at different time interval and their ICBR (Pooled 1991-92 to 1993-94).

Treatments	*Before dusting*	*Av. no. of aphids per 10 cm long twig.*				
		After first dusting				
		24h	*48h*	*72h*	*One week*	*Two week*
Carbaryl 5% dust	6.07* (38.93)	1.60 (2.53)	1.38 (1.75)	1.52 (2.36)	2.00 (4.56)	3.26 (10.27)
Endosulfan 2% dust	6.44 (43.13)	3.40 (15.72)	2.11 (6.68)	1.83 (3.79)	1.63 (0.61)	2.59 (10.92)
Endosulfan 4% dust	6.40 (43.36)	1.59 (2.54)	0.91 (0.58)	0.93 (0.38)	1.30 (2.17)	2.44 (8.48)
Methyl Parathion 2% dust	6.38 (42.76)	0.79 (0.13)	0.71 (0.01)	0.86 (0.25)	1.38 (3.1)	2.61 (9.97)
Fenvalerate 0.4% dust	6.50 (44.23)	0.95 (0.51)	0.91 (0.45)	0.86 (0.28)	1.59 (2.71)	4.24 (20.82)
Control	6.65 (46.66)	8.44 (63.77)	9.34 (87.22)	9.16 (84.01)	9.42 (73.16)	9.08 (93.87)
S. Em.	0.18	0.50	0.44	0.27	0.22	0.53
C. D. at 5%	NS	1.56	1.39	0.83	0.70	1.66
C. V. %	5.56	24.88	19.85	16.02	14.76	23.67

*$\sqrt{X + 0.5}$ transformed values.
Figures in the parentheses are original values.

TABLE 2

Effect of various dust formulations on safflower aphid, *U. compositae* and their ICBR at different time interval (Pooled 1991-92 to 1993-94).

Treatments	*Av. no. of aphids per 10 cm long twig.*						
	After second dusting						
	24h	*48h*	*72h*	*One week*	*Two week*	*Yield (kg/ha) Pooled*	*ICBR*
Carbaryl 5% dust	1.48 (2.02)	0.80 (0.13)	1.01 (0.37)	0.89 (0.33)	1.10 (0.55)	799	1 : 1.19
Endosulfan 2% dust	3.00 (14.39)	1.00 (0.20)	0.86 (0.30)	0.87 (0.10)	0.82 (0.12)	712	1 : 0.99
Endosulfan 4% dust	1.65 (3.30)	0.79 (0.13)	0.74 (0.08)	0.80 (0.16)	0.78 (0.12)	781	1 : 1.17
Methyl Parathion 2% dust	0.88 (0.29)	0.75 (0.08)	0.76 (0.11)	0.80 (0.16)	0.83 (0.21)	1033	1 : 5.48
Fenvalerate 0.4% dust	1.13 (1.04)	0.80 (0.14)	0.86 (0.26)	0.92 (0.36)	1.13 (1.12)	738	1 : 0.81
Control	7.01 (64.71)	7.05 (59.93)	7.57 (64.31)	7.67 (69.97)	6.45 (68.18)	608	
S. Em.	0.58	0.41	0.22	0.39	0.53	28.66	
C. D. at 5%	1.83	1.29	0.68	1.24	1.66	81.89	
C. V. %	34.85	14.84	15.77	15.35	51.94	10.07	

* $\sqrt{X + 0.5}$ transformed values.
Figures in the parentheses are original values.

2% dust and endosulfan 2% dust showed equally persistancy against *U. compositae* as endosulfan 4% dust and fenvalerate 0.4% dust till two weeks of their applications.

Methyl parathion 2% dust and fenvalerate 0.4% dust treated safflower crop had considerably lower *U. compositae* population than endosulfan 2% dust after 24h of their application. Ghorpade *et al.*, (1994) have also reported the effectiveness of methyl paration 2% dust against saflower aphid. Carbaryl 5% dust and endosulfan 4% dust showed equal aphicidal property as methyl parathion 2% dust, fenvalerate 0.4% and endosulfan 2% dust. After 48h none of the dust formulations could show superiority to each other till two weeks of their applications.

Thus, all the five tested insecticide formulations were found effective against *U. compositae*.

Among the insecticides safflower dusted with methyl paration 2% dust yielded considerably higher yield than fenvalerate 0.4% and endosulfan 2% dusted crop. Carbaryl 5% dusted crop had higher yield than endosulfan 2% dusted crop. Considering the cost of protection and benefit obtained, methyl parathion 2% dust showed highest ICBR (1 : 5.48) followed by carbaryl 5% (1 : 1.19) and endosulfan 4% (1 : 1.17).

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