

Persistence of toxicity of some insecticides in dust and wettable forms against mustard aphid, *Lipaphis erysimi* (kalt)

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Abstract- An experiment was laid out with 12 treatments including control to find out the persistence of toxicity of insecticides in dust and wettable formulations at their recommended concentrations during winter season on mustard crop. The residual effectiveness was worked out in the laboratory by observing mortality on the treated apical growth parts of mustard plant of each treatment after 24 hrs, 5 and 10 days of insecticidal applications and in the field by taking observations on aphid population. Both under field and laboratory conditions, fenitrothion 0.1% spray and phenthoate 2% dust proved most effective. Carbaryl 0.1% spray proved ineffective. After 10 days of treatment all insecticides of dust and wettable formulations last their toxicity.

Keyword- *Lipaphis erysimi* (kalt.), fenitrothion, carbaryl, quinalphos, endosulfan

Introduction

Mustard aphid, *Lipaphis erysimi* (kalt.) is a regular menace to mustard (*brassica spp.*) and other cruciferous crops. Nymphs and adults suck cell sap from the leaves, inflorescence and pods culminating into very poor pod setting and yield. Several insecticides in emulsion forms has been reported with varying results [1-4] but practically no information on the effectiveness of dust formulations against the pest is available. Therefore some insecticides in dust and wettable were tried against the pest.

Material and Methods

An experiment with 2 treatments including control (table 1) with plot size of 1x1 m, having four rows at distance of 30 cm. Variety "Varuna" of mustard was sown. Each treatment was replicated thrice. Dusting and spraying were done on 55 days old crop when the aphid population ranged from 6.0 to 11.2 aphids/ 10-cm long twig. Dusts were applied @ 25 kg/ha. Fenitrothion, carbaryl and DDT each were sprayed at 0.1% concentration. Observations on residual action were recorded in the field and also in the laboratory for conformation. Aphid population was counted 1 day prior to spraying on 10 apical twigs/ plots each of 10-cm length. In laboratory study 5 apical twigs (10 cm long) were plucked from each treatment after 24 hrs, 5 days, and 10 days of treatment. The cut ends of each the twigs collected from each of the treatment were dipped into the water in glass tube and were replicated thrice. Mortality observations were recorded after 24 hrs of release. Data were subjected to statically analysis.

Results and Discussion

In the field study, pretreatment population was found to be uniformly distributed in all the treatments and ranged from 6.0 to 11.2 aphids/ 10 cm long twig. After 24 hrs of spray all insecticidal treatments significantly reduced the aphid population, which ranged from 0 to 2.9

aphids per plant as against 0.2 aphid per plant in control. Phenthoate and fenitrothion were found to be highly toxic, each recording 0 populations DDT 0.1% spray was found least toxic and significantly inferior to remaining insecticides except carbaryl 0.1%. After 5 days of treatment again all insecticides were significantly superior (0 to 116 aphids) except DDT and carbaryl to control (24.4 aphids). Fenitrothion again recorded 0 population of aphid per plant, which remained statically at par with quinalphos and methylparathion but superior to remaining insecticides. DDT 0.1% (25.4 aphids) was statically at par with control. carbaryl 0.1% proved ineffective. All insecticides lost their effectiveness [4-6] 10 days after their treatments recording 27 to 47.3 aphids among the treatments as against 46.2 aphids in control. In laboratory study, after 1 day of treatment all insecticidal treatments were significantly superior to control recording 20 to 100% aphid mortality as against 2.5% in control. Fenitrothion, phenthoate, quinalph, methylparathion, phosalone, BHC and DDT proved highly toxic and each inflicted 100% aphid mortality and proved significantly superior to remaining insecticides. Endosulfan inflicted 68.94% aphid mortality and proved significantly superior to carbaryl 0.1% and DDT 0.1% spray. Carbaryl and DDT remained least effective but differed significantly from each other. After 5 days of treatment all insecticidal treatments remained superior to control. Fenitrothion proved highly toxic inflicting 100% aphid mortality and remained significantly superior to remaining insecticides. The other insecticides in decreasing order of effectively were phenthoate (90%), quinalphos and methylparathion both formulations (each inflicting 87.5% aphid mortality) and phosalone (82.5% aphid mortality). Carbaryl 0.1%, DDT 0.1% and endosulfan 4% dust proved least effective inflicting 36.69, 33.75 and 27.32% aphid mortality, respectively. Almost all the insecticides proved ineffective after 10 days of their

treatments except phenthoate, which also recorded only 17.5% mortality.

References

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Table1- Persistence of toxicity of insecticides in dust and spray formulations against mustard aphid *Lipaphis erysimi*

Chemical	Formulation	%aphid mortality after treatment (in Lab)			No. of aphid/10 cm long twig (in field)			
					Pre-treatment	After treatment		
		1 day	5 day	10 day		1 day	5 day	10 day
Phosalone	Zolone 4%	100 (90)	82.5 (68.79)	2.5 (4.6)	6.6 (2.41)	1.2 (1.14)	13.8 (3.41)	43.3 (6.18)
BHC	BHC 5%	100 (90)	55 (51.64)	5 (6.6)	7.6 (2.67)	1 (1.09)	16 (3.77)	29.9 (6.18)
Endosulphan	Thiodone 4%	77.5(68.94)	22.5 (27.32)	0.0 (0.0)	6 (2.40)	0.9 (1.11)	6.9 (2.28)	27.3 (5.25)
DDT	DDT 5%	100 (90)	45 (45.21)	7.5 (13.8)	7.7 (2.77)	0.5 (0.93)	4.2 (1.90)	27 (5.10)
Quinalphos	Ekalux 2%	100 (90)	87.5 (78.75)	0.0 (0.0)	8.3 (2.77)	0.2 (0.81)	0.9 (1.04)	27 (5.50)
Phentholate	Elsan 2%	100 (90)	90 (76.71)	17.52 (21.5)	11 (3.04)	0.0 (0.71)	5.4 (1.90)	29.2 (5.33)
Methylparthion	Metaacid 2%	100 (90)	87.5 (75.09)	0.0 (0.0)	9 (2.73)	0.4 (0.87)	3.1 (1.72)	46.9 (6.700)
Methylparthion	Ekatox 2%	100 (90)	87.5 (75.09)	0.0 (0.0)	9.9 (3.01)	0.3 (0.86)	1.2 (1.24)	23.4 (4.81)
Fenitrothion 0.1%	Sumithion 40	100 (90)	100 (90)	2.5 (4.6)	11.2 (3.21)	0.0 (0.71)	0.0 (0.71)	27.5 (5.23)
DDT 0.1%	DDT 50 WP	20 (25.82)	32.5 (33.75)	0.0 (0.0)	9.4 (3.12)	2.9 (1.63)	25.4 (5.05)	4.41 (6.11)
Carbaryl 0.1%	Sevin 50 WP	35 (35.41)	42.5 (36.69)	2.5 (4.60)	9.2 (3.09)	1.6 (1.37)	30.8 (5.56)	47.3 (6.49)
Control	Untreated	2.5 (3.35)	7.5 (11.25)	0.0 (0.0)	9.4 (3.07)	20.2 (4.45)	24.4 (4.76)	46.2 (6.76)
S.Em +		-4.92	-9.94	-4.05	-0.31	-0.16	-0.16	-0.45
C.D at 5%		-14.21	-28.69	-11.7	N.S	-0.44	-0.44	-1.3

Figures mark with asterisk are converted to $v \sqrt{x} + 0.5$

Abbreviations

DDT- p,p-dichloro diphenyl trichloroethane

BHC- Benzene Hexa Chloride