



Research Paper

**EFFICACY OF DIFFERENT INSECTICIDES AGAINST MUSTARD APHID,
L. erysimi INFESTING MUSTARD CROP**

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Abstract

Efficacy of different insecticide against pests infesting mustard revealed that out of eleven insecticides tested, the insecticidal treatments viz., 0.003 per cent thiomethoxam (15.73 nymphal and adult population per five plants), 0.005 per cent lambda cyhalothrin (17.12 nymphal and adult population per five plants) and 0.005 per cent imidacloprid (19.15 nymphal and adult population per five plants) were found to be effective for the control of mustard aphid, *L. erysimi*. The decreasing order of efficacy of different insecticidal treatments was 0.003 per cent thiomethoxam, 0.005 per cent lambda cyhalothrin, 0.005 per cent imidacloprid, 0.03 per cent dimethoate, 0.5 per cent nimbecidine, 0.005 per cent fipronyl, 0.05 per cent DDVP, 0.006 per cent clothianidin, 0.05 per cent profenophos, 0.05 per cent quinolphos and 0.05 per cent cartap hydrochloride.

Key words: Aphid, Thiomethoxam, Mustard, Imidacloprid.

INTRODUCTION

Indian mustard, *Brassica juncea* Linn commonly known as “mohari”, “rai” or “raya” is one of the important edible oilseed crops grown in the country. Mustard plays an important role in human diet and it has an important place in Indian economy. The oil contents of mustard seed varies from 32 to 40 per cent and protein contents from 15 to 17 per cent. The mustard crop grown well in the Konkan region and is one of the important oilseed crops of the region with productivity of 333 kg/ha. The reasons for such poor yield can be attributed to, amongst others, heavy infestation of insect pests (Sonkar, 1997).

Bonnemaison (1965) reported that 42 insect pests infest the cruciferous crops, out of which the pests viz., mustard sawfly, *Athalia proxima* (Klug.), *Bagrada cruciferarum* (Kirk.), mustard aphid, *Lipaphis erysimi* Kalt, leaf miner, *Phytomyza atricornis* (Meigen), flea beetle, *Phyllotreta cruciferae* (G.) and cabbage leaf webber, *Hellula undalis* (F.) cause economic damage to the crop throughout the crop stage. The losses in yield due to mustard aphids ranged from 9 to 95 per cent while the losses due to sawfly were estimated up to 32.2 per cent (Singh *et al.*, 1980). Joshi *et al.* (1998) reported that the crop sown in September to October suffered 26.84 to 74.43 per cent loss in yield due to painted bug. the mustard crop, aphids, *Lipaphis erysimi* is the most serious pest which is a cosmopolitan in warmer regions of the world. It occurs on all the

cruciferous crops all over the country. Both nymphs and adults suck the cell sap from leaves, petioles, tender stems, inflorescences and tender pods.

MATERIALS AND METHODS:

A statistically designed field experiment using Randomized Block Design was laid out at the farm of College of Agriculture, Dapoli, Dist. Ratnagiri, with three replication and twelve treatments with variety Pusa bold. Sowing of seed on the flat beds of 3.15 X 3.00m size with at 45 X 15cm spacing done. Method and time of insecticide application, the quantity of spray suspension required per plot was calibrated prior to each spraying. A total of three sprays were given by using a ASPEE Knapsack Sprayer. The first spraying was undertaken on one and half month after sowing when the pest incidence was noticed. Method of recording observations for Mustard aphid no. of nymphs and adults were recorded on 10cm portion of apical twig on five randomly selected plants in each plot. The pretreatment observations were recorded a day before spraying and the post treatment observations were recorded at 1st, 5th, 10th and 15th day after each spraying. The data thus obtained were analysed statistically and presented.

RESULT AND DISCUSSION:

The data recorded on the mean nymphal and adult population of mustard aphids per five plants in various insecticidal treatments recorded at 1st, 5th, 10th and 15th days after spraying are presented in Table 1.

The data recorded on the mean nymphal and adult population of mustard aphids at first day after spraying (Table 1) revealed that the lowest mean nymphal and adult population of 13.44 per five plants was recorded in an insecticidal treatment with 0.003 per cent thiomethoxam which was significantly lower than the insecticidal treatments viz., 0.05 per cent DDVP (22.04 nymphal and adult population per five plants), 0.006 per cent clothianidin (27.73 nymphal and adult population per five plants), 0.05 per cent profenophos (33.46 nymphal and adult population per five plants), 0.05 per cent quinolphos (43.22 nymphal and adult population per five plants) and 0.05 per cent cartap hydrochloride (43.76 nymphal and adult population per five plants) and it was at par with the remaining insecticidal treatments. The mean nymphal and adult population of mustard aphids per five plants ranged from 13.44 to 43.76 in different insecticidal treatments as against 324.08 in an untreated control. All the insecticidal treatments were significantly superior over untreated control in reducing the mustard aphid population.

The data recorded on the mean nymphal and adult population of mustard aphids at 5th day after spraying (Table 1) revealed that the lowest mean nymphal and adult population of 7.01 per five plants was recorded in an insecticidal treatment with 0.003 per cent thiomethoxam which was significantly lower than the insecticidal treatments viz., 0.05 per cent DDVP (16.22 nymphal and adult population per five plants), 0.006 per cent clothianidin (21.85 nymphal and adult population per five plants), 0.05 per cent profenophos (28.92 nymphal and adult population per five plants), 0.05 per cent quinolphos (37.56 nymphal and adult population per five plants) and 0.05 per cent cartap hydrochloride (38.44 nymphal and adult population per five plants) and it was at par with the remaining insecticidal treatments. The mean nymphal and adult population of mustard aphids per five plants ranged from 7.01 to 38.44 in different insecticidal treatments as against 336.82 in an untreated control. All the insecticidal treatments were significantly superior over untreated control in reducing the mustard aphid population.

Table 1. Efficacy of different insecticides against mustard aphid, *L. erysimi*

Insecticidal treatment	Mean aphid population per five plants					Overall mean
	Day after spraying					
	Pretreatment count	Post treatment count DAT				
		1	5	10	15	
0.05 % quinolphos	148.08 (12.21)	43.22 (6.65)	37.56 (6.21)	44.56 (6.75)	75.39 (8.74)	50.18 (7.09)
0.005 % lambda cyhalothrin	140.85 (11.91)	19.18 (4.38)	10.90 (3.45)	13.89 (3.59)	24.50 (5.05)	17.12 (4.12)
0.006 % clothianidin	125.79 (11.26)	27.73 (5.36)	21.85 (4.78)	28.59 (5.44)	42.82 (6.62)	30.25 (5.55)
0.003 % thiomethoxam	124.89 (11.22)	13.44 (3.80)	7.01 (2.83)	13.75 (3.84)	28.70 (5.45)	15.73 (3.98)
0.5 % nimbicidine	126.24 (11.28)	17.66 (4.32)	13.75 (3.84)	16.81 (4.22)	40.99 (6.48)	22.30 (4.72)
0.05 % profenophos	148.93 (12.22)	33.46 (5.87)	28.92 (5.47)	37.81 (6.23)	49.41 (7.10)	37.40 (6.17)
0.05 % DDVP	113.92 (10.72)	22.04 (4.80)	16.22 (4.15)	17.84 (4.34)	38.94 (6.32)	23.76 (4.90)
0.005 % imidacloprid	113.92 (10.72)	14.92 (3.99)	10.49 (3.39)	15.32 (4.04)	35.85 (6.07)	19.15 (4.37)
0.03 % dimethoate	113.92 (10.72)	18.89 (4.46)	13.36 (3.79)	16.81 (4.22)	32.99 (5.83)	20.51 (4.58)
0.05 % cartap hydrochloride	169.83 (13.07)	43.76 (6.69)	38.44 (6.28)	49.41 (7.10)	74.69 (8.70)	51.58 (7.19)
0.005 % fipronyl	109.46 (10.51)	19.79 (4.56)	13.75 (3.84)	15.65 (4.08)	40.47 (6.44)	22.42 (4.73)
Control	324.00 (18.00)	324.08 (18.03)	336.82 (18.38)	325.16 (18.06)	333.52 (18.29)	329.90 (18.19)
S.E.±	0.36	0.34	0.37	0.35	0.31	0.19
C.D. at 5%	1.05	0.98	1.09	1.02	0.90	0.54

* Figures in parentheses are $\sqrt{x+1}$ values

The data recorded on the mean nymphal and adult population of mustard aphid at 10th day after spraying (Table 1) revealed that the lowest mean nymphal and adult population of 13.75 per five plants was recorded in an insecticidal treatment with 0.003 per cent thiomethoxam which was significantly lower than the insecticidal treatments viz., 0.006 per cent clothianidin (28.59 nymphal and adult population per five plants), 0.05 per cent profenophos (37.81 nymphal and adult population per five plants), 0.05 per cent quinolphos (44.56 nymphal and adult population per five plants) and 0.05 per cent cartap hydrochloride (49.76 nymphal and adult population per five plants) and it was at par with the remaining insecticidal treatments. The mean nymphal and adult population of mustard aphids per five plants ranged from 13.75 to 49.76 in different insecticidal treatments as against 325.16 in an untreated control. All the insecticidal treatments were significantly superior over untreated control in reducing the mustard aphid population.

The data recorded on the mean nymphal and adult population of mustard aphids at 15th day after spraying (Table 1) revealed that the lowest mean nymphal and adult population of 24.50 per five plants was recorded in an insecticidal treatment with 0.005 per cent lambda cyhalothrin which was significantly lower than the insecticidal treatments viz., 0.05 per cent imidacloprid (35.85 nymphal and adult population per five plants), 0.05 per cent DDVP (38.94 nymphal and adult population per five plants), 0.005 per cent fipronyl (40.47 nymphal and adult population per five plants), 0.5 per cent nimbecidine (40.99 nymphal and adult population per five plants), 0.006 per cent clothianidin (42.82 nymphal and adult population per five plants), 0.05 per cent profenophos (49.41 nymphal and adult population per five plants), 0.05 per cent cartap hydrochloride (74.69 nymphal and adult population per five plants) and 0.05 per cent quinolphos (75.39 nymphal and adult population per five plants) and it was at par with the remaining insecticidal treatments. The mean nymphal and adult population of mustard aphids per five plants ranged from 24.50 to 75.39 in different insecticidal treatments as against 333.52 in an untreated control. All the insecticidal treatments were significantly superior over untreated control in reducing the mustard aphid population.

The observations recorded on the mean nymphal and adult population of mustard aphids at 1st, 5th, 10th and 15th day post treatments at each of the three spray applications were averaged out and the data thus obtained as an overall mean nymphal and adult population per five plants and presented in Table 1.

The results revealed that the lowest overall mean nymphal and adult population of mustard aphids of 15.73 per five plants was recorded in an insecticidal treatment with 0.003 per cent thiomethoxam which was significantly lower than the insecticidal treatments viz., 0.03 per cent dimethoate (20.51 nymphal and adult population per five plants), 0.5 per cent nimbecidine (22.30 nymphal and adult population per five plants), 0.005 per cent fipronyl (22.42 nymphal and adult population per five plants), 0.05 per cent DDVP (23.76 nymphal and adult population per five plants), 0.006 per cent clothianidin (30.25 nymphal and adult population per five plants), 0.05 per cent profenophos (37.40 nymphal and adult population per five plants), 0.05 per cent quinolphos (50.18 nymphal and adult population per five plants) and 0.05 per cent cartap hydrochloride (51.58 nymphal and adult population per five plants) and it was at par with the remaining insecticidal treatments. The overall mean nymphal and adult population of mustard aphids per five plants ranged from 15.73 to 51.58 in different insecticidal treatments as against 329.90 in an untreated control. All the insecticidal treatments were significantly superior over untreated control in reducing the mustard aphid population.

The decreasing order of efficacy of different insecticidal treatments was 0.003 per cent thiomethoxam, 0.005 per cent lambda cyhalothrin, 0.005 per cent imidacloprid, 0.03 per cent dimethoate, 0.5 per cent nimbecidine, 0.005 per cent fipronyl, 0.05 per cent DDVP, 0.006 per cent clothianidin, 0.05 per cent profenophos, 0.05 per cent quinolphos and 0.05 per cent cartap hydrochloride.

The present findings confirmed those of Arivudainambi and Prasad (2003) who reported that 0.005 per cent deltamethrin and 0.005 per cent imidacloprid were found to be effective in minimizing the mustard aphid population. The present findings also confirmed those of Gour and Pareek (2003) who reported that the 0.03 per cent dimethoate was the most effective treatment in controlling the mustard aphid, *L. erysimi* followed by 0.005 per cent imidacloprid and 0.002 per cent cypermethrin. Rohilla *et al.* (2004) reported that the 0.0178 per cent imidacloprid and 0.003 per cent

thiomethoxam (Actara) proved to be most effective against mustard aphid and increasing the yield.

From the present studies it was noticed that the insecticidal treatments viz., 0.003 per cent thiomethoxam, 0.005 per cent lambda cyhalothrin and 0.005 per cent imidacloprid were the most effective for the control of mustard aphids. The application of one of these insecticides may be undertaken at fortnightly interval immediately after the pest incidence is noticed on need basis for the effective control of the pest.

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