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Effect of number of spray and time of application of monocrotophos for the control of mustard aphid *Lipaphis erysimi* (Kalt.) On mustard

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Abstract

Field experiment was conducted to find out the appropriate time of monocrotophos application and number of spraying against mustard aphid, *Lipaphis erysimi* (Kalt.). Three and more sprays including spray at initiation of aphid infestation monocrotophos gave maximum protection against aphid and registered higher grain yield also. Three sprays at 15 days interval starting from initiation of aphid infestation gave maximum net return (Rs. 23220/ha.) but one spray at 15 days after initiation of aphid infestation were the most economical (1:14.8).

Keywords: Mustard, *Lipaphis erysimi*, net return, economical

Introduction

It is a well known fact that the attack of mustard aphid, *Lipaphis erysimi*, (Kalt.) is a threat to *Brassica* cultivation. The reduction in seed yield of mustard has been reported 45 per cent (Singh *et al.*, 1983) [8] in Punjab whereas 35 to 72.3 per cent in Uttar Pradesh and Madhya Pradesh (Bakhetia, 1986 and Bhadauria and Jakhmola, 1995) [2]. There is a doubt that the management of this aphid is not possible without chemical protection but the same time judicious use of insecticide is also needed due to its established hazard. Looking to this need a study was conducted to find out appropriate time and number of insecticidal application for the management of this serious pest of mustard. Monocrotophos was used as test insecticide due to its tested efficacy against this aphid earlier. (Bhadauria *et al.*, 1982, Sriram *et al.*, 1985, Shrivastava and Singh, 1985, Das *et al.*, 1996, Gami *et al.*, 2002 and Rohilla *et al.*, 2004) [11, 4, 5, 10, 7].

Material and Methods

Varuna variety of mustard was sown on November 10, 2013 in 4m × 2.4m plot size with three replication in randomized block design. Spray of monocrotophos 36 SL (0.036 per cent) was given at initiation of aphid infestation and repeated after 15, 30 and 45 days making combinations as one, two, three and four application (Table 1.). Observation of aphid population was recorded on 10 randomly selected apical twigs each of 10 cm length from the four inner rows per plot. Pretreatment observation was recorded 24 hr. before first spray and than after 14 days after each spray. Yield of different treatments was also recorded. Cost benefit ratio was worked out by computing the cost of treatment and the gross income obtained from respective spray schedule.

Results and Discussion

On the basis of average of five observation minimum aphid population i. e. 12.6 was recorded in the plots receiving four sprays which found significantly less than rest of the treatments except plot receiving three sprays of different combinations. Maximum mean aphid population i.e. 114.4 was recorded in the plot receiving spray only at 45 days after initiation of aphid infestation which was significantly higher than that all the treated plots but was at par with untreated plots.

Maximum grain yield (1438 kg/ha.) was obtained from the plot receiving four sprays, which found significantly higher than rest of the combinations. Minimum grain yield (425 kg./ha.) was obtained in untreated plots which was significantly less than all the insecticidal treatments except one spray at 45 days after initiation of aphid infestation.

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Table 1: Mean aphid population, yield and economics in different treatments.

S. No	Treatments	Mean aphid Population/10Cm apical twing length	Yield Kg/ha.	Increase in Yield over Control	Cost of Increase Yield (Rs.)	Cost of Treatment (Rs.)	Net return (Rs.)	Cost Benefit ratio
1.	One spray at IAI	41.0 (6.4)	1025	600	16,200	1215	14,985	12.3
2.	One spray at 15 DAIAI	43.9 (6.6)	1136	711	19,197	1215	17,982	14.8
3.	One spray at 30 DAIAI	73.1 (8.5)	875	450	12,150	1215	10,935	9.0
4.	One spray at 45 DAIAI	114.4 (10.7)	484	59	1593	1215	378	0.3
5.	Two spray at IAI and 15 DAIAI	34.0 (5.8)	1260	835	22,545	2430	20,115	8.2
6.	Two spray at IAI and 30 DAIAI	34.2 (5.8)	1236	811	21897	2430	19,467	8.0
7.	Two spray at IAI and 45 DAIAI	43.5 (6.6)	1078	653	17,631	2430	15,201	6.2
8.	Two spray at 15 and 30 DAIAI	47.5 (6.9)	1260	835	22,545	2430	20,115	8.2
9.	Two spray at 15 and 45 DAIAI	57.7 (7.6)	1145	720	19,440	2430	17,010	7.0
10.	Two sprays at 30 and 45 DAIAI	72.9 (8.5)	921	496	13,392	2430	10,962	4.5
11.	Three sprays at IAI and 15 and 30 DAIAI	21.8 (4.6)	1420	995	26,865	3645	23,220	6.4
12.	Three sprays at IAI and 15 and 45 DAIAI	22.8 (4.8)	1375	950	25,650	3645	22,005	6.0
13.	Three sprays at IAI and 30 and 45 DAIAI	27.2 (5.2)	1288	863	23,301	3645	19,656	5.4
14.	Three sprays at 15, 30 and 45 DAIAI	29.3 (5.4)	1287	862	23,274	3645	19,629	5.4
15.	Four sprays at IAI and 15,30 and 45 DAIAI	12.6 (3.5)	1438	1013	27,351	4860	22,491	4.6
	Control	111.9 (10.6)	425					
	S.E (m) ±	(0.66)	5.8					
	C.D. at 5%	(1.92)	152.0					

- Figures in parenthesis are $\sqrt{n} + 0.5$ value.
- IAI : Initiation of aphid infestation
- DAIAI: Days after initiation of aphid infestation.

In the present findings three and four sprays have given maximum protection against aphid but two spray i.e. at initiation of aphid and 15 or 30 days after initiation and single spray at initiation or 15 days gave protection at par with three sprays which is remarkable. This indicates that single sprays of effective insecticide is sufficient if given at around 15 days of initiation of aphid infestation on crop. However, on the basis of cost benefit ratio two sprays i.e. first at initiation followed by 15 or 30 days proved to be best. Recommendation of one spray has been supported by Sinha *et al.* (1997) [9], two or three spray by Das *et al.* (1996) [4] and four sprays by Mukhopadhyaya and Ghosh (1979) [6]. Three spray of Monocrotophos at 15 days interval starting from initiation of aphid infestation gave maximum net return of Rs. 23220/ha. Followed by four sprays (Rs. 22491/ha.). Only one spray at 45 days after initiation of aphid infestation registered a minimum net return of Rs. 378/ha. On the basis of cost benefit ratio, one spray at 15 days after initiation of aphid infestation was most economical (1:14.8) followed by one spray at initiation of aphid infestation.

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