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Original Research Article

Effect of Exposure Period for Aphid Infestation on Aphid Population and Seed Yield of Mustard

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A B S T R A C T

Field experiment was conducted to find out the effect of exposure period for aphid infestation on aphid population and seed yield of mustard. Protection with insecticide from initiation of aphid infestation (Imidacloprid) most effective for aphid control and gave higher seed yield also. Protection with insecticide after one week of aphid infestation (Imidacloprid) provides maximum net profit (Rs. 24007/ha.) and most economical (1:10.6).

Keywords

Mustard, Aphid (*Lipaphis erysimi*), Net profit, Economical

Introduction

Mustard aphid, *Lipaphis erysimi* is one of the most serious pest and considered to be a major limiting factor for successful cultivation of the crop; causing up to 96 per cent yield losses (Singh and Sachan, 1994; Singh and Premchand, 1995; Sharma and Kashyap, 1998; Singh, Sharma, 2002). Considering yield losses due to this pest, chemical control measures are suggested and in many cases seed yield loss have been minimized 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 effect of exposure period for aphid infestation on aphid population and seed yield. Imidacloprid is effective mainly against sap-sucking insects, and possesses low toxicity to natural enemies and a long residual period (Barberá, 1989). Rana *et al.*, (2007) reported that imidacloprid were effective for management of mustard aphid.

Materials and Methods

Rohini variety of mustard was sown on November 08, 2013 and November 10, 2014 in $4m \times 1.8m$ plot size with three replication in randomized block design. Protection with insecticide (imidcloprid 17.8 SL @ 20 g a.i. per ha.) from initiation of aphid infestation, after one week, two week, three week, four week, five week, six week of aphid initiation, Protection with neem leaves extract and water spray from initiation of aphid infestation.

Application of each treatment was repeated at 15 days interval (Table 1). Observation of aphid population was recorded on 10 randomly selected 10cm apical twig/plot at pre and post (3, 7 and 14 days) application of treatments.

Yield data was also recorded at the time of harvest. Cost benefit ratio was worked out by computing the cost of treatment and the gross income obtained from respective spray schedule.

Table.1 Economics of different treatments for the control of insect pests of mustard crop

S.No.	Treatments	Symbols	Mean aphid population/10Cm apical twing under different exposure period	Seed yield (kg/ha)	Increased yield over control (kg/ha)	Cost of increased yield over control (Rs/ha)	Cost of the treatments (Rs/ha)	Net profit (Rs/ha)	Cost benefit ratio
1	Protection with insecticide from initiation of aphid	T_1	9.17 (0.96)*	1270	980	26460	2830	23630	8.3
2	Protection with insecticide after one week of aphid	T_2	13.60 (1.13)	1263	973	26271	2264	24007	10.6
3	Protection with insecticide after two week of aphid	T_3	30.56 (1.49)	980	690	18630	2264	16366	7.2
4	Protection with insecticide after three week of aphid	T_4	52.94 (1.72)	540	250	6750	1698	5052	3.0
5	Protection with insecticide after four week of aphid	T_5	72.35 (1.86)	429	139	3753	1698	2055	1.2
6	Protection with insecticide after five week of aphid	T_6	101.04 (2.00)	387	97	2619	1132	1487	1.3
7	Protection with insecticide after six week of aphid	T_7	98.44 (1.99)	310	20	540	1132	-592	-0.5
8	Protection with neem leaves extract from initiation of aphid infestation	T_8	26.25 (1.42)	707	417	11259	3216	8043	2.5
9	Protection with water spray from initiation of aphid infestation	T_9	51.67 (1.71)	512	222	5994	2680	3314	1.2
10	Untreated control	T_{10}	113.67 (2.06)	290					
	S.E.(m)±		**(0.016)**	51					
	C.D. at 5%		**(0.048)**	154					

Mustard cost Rs. 27 per kg
Labour cost for spraying (2 Lobours per ha @ Rs. 263/-) = Rs. 536/-
imidacloprid cost Rs. 150 per 100 gm

Results and Discussions

On the basis of average of aphid population recorded at different days after application in two years experimentation observed that the minimum aphid population (9.17 aphids/twing) in the plots protected with insecticide from initiation of aphid infestation was significantly less than all the treated and untreated plots except plots protected from one week, two week after initiation and protected with neem leaves extract from initiation of aphid infestation. Aphid population (51.67 aphids/twing) in the plots treated with water spray from initiation of aphid infestation and protected with insecticide three week after initiation of aphid infestation were at par with the population in untreated plots this indicate that insecticidal treatments must be started at two week after initiation of aphid infestation.

Maximum grain yield (1270 kg/ha.) was recorded in T_1 (Protection with insecticide from initiation of aphid infestation) which found significantly higher than all the treatments except T_2 (Protection with insecticide after one week of aphid infestation). Minimum grain yield (290 kg / ha.) was recorded in T_{10} (untreated plot) which found significantly less than rest of the all other treatment except T_7, T_6, and T_5 (Protection with insecticide after six week, five week and four week of aphid infestation) this indicate that crop may be protected with insecticide after one week of aphid infestation.

Maximum net profit (Rs. 24007/ha.) was recorded in T_2 (Protection with insecticide after one week of aphid infestation) followed by T_1 (Protection with insecticide from initiation of aphid infestation) and T_3 (Protection with insecticide after two week of aphid infestation). However the basis of cost benefit ratio T_2 (Protection with insecticide after one week of aphid infestation) was most economical followed by T_1 (Protection with insecticide from initiation of aphid infestation), T_3 (Protection with insecticide after two week of aphid infestation) and T_4 (Protection with insecticide after three week of aphid infestation). Sharma *et al.*, (2000) have also reported higher net profit was obtained when sprayed the crop at ETL followed by one week exposure.

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