Management of mustard aphid, *Lipaphis erysimi* Kalt on mustard crop

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ABSTRACT

Field experiment was conducted during rabi season of 2014 to study the management strategies against aphid, *Lipahis erysemi* on mustard crop in two villages of Gopalganj district of Bihar. The present experiment comprising ten treatments was laid out in randomised block design with three replications. The results showed that all the insecticidal treatments were significantly superior to untreated control in minimising aphid population. In overall the minimum (4.55 and 5.09) mean number of aphids on 10 cm terminal portion of shoots per plant was recorded in treatments clipping of aphid infested twigs and spraying with Anaconda 50 EC (chlorpyriphos 45% + cypermethrin 5%) @ 1.0 ml/l water at 10 days interval and clipping of aphid infested twigs and spraying with polytrin 44 EC (profenophos 40% + cypermethrin 4%) @ 1.0 ml/l water at 10 days interval respectively the two being at par in comparison to the 12.48 in untreated control. Maximum yield of 13.68 and 12.56 q/ha was also recorded in the same two treatments respectively the two being at par as compared to 6.39 q/ha obtained in case of control.

Keywords: Aphid; mustard; yield; insecticides; spraying; clipping

INTRODUCTION

Mustard aphid, *Lipaphis erysimi* Kalt is the key pest of rapeseed-mustard crop in India. This pest is widely distributed in all parts of the country. It causes 65.5 to 95.7 per cent loss in seed yield (Bakhetia 1984) and loss in oil content up to 15 per cent (Verma and Singh 1987, Gupta et al 2003) at different places of India. Many insecticides have been recommended to manage this menace.

Generally aphids appear from January to March with higher population during flowering stage of the crop (mid-February to mid-Match). Both nymphs and adults damage the plants by sucking sap from leaves, stems, inflorescence and developing pods. Resulting leaves curl, the flowers fail to form pods and the developing pods do not produce healthy seeds and in severe cases the plants may wither.

MATERIAL and METHODS

Field experiment was conducted during rabi 2014 at the farmers' fields in Gopalganj district of Bihar. Ten treatments [T_1: Alternate spray of thiomethoxam 25 WSG @ 0.25 ml/l and imidacloprid 17.852 SL @ 0.4 ml/l water at 10 days interval, T_2: Alternate spray of NSKE 5% and fenvolerate 10 EC @ 1.0 ml/l water at 10 days interval, T_3: Alternate spray of lufenuron 5 EC @ 1.0 ml/l and azadirachtin 0.15% @ 4.0 ml/l water at 10 days interval, T_4: Alternate spray of buprofezin 25 EC @ 1.0 ml/l and difentheuron 50 WP @ 1.0 g/l water at 10 days interval, T_5: Clipping of aphid infested twigs and spraying with thiacloprid 21.7 SC @ 0.25 ml/l water at 10 days interval, T_6: Clipping of aphid infested twigs and spraying with acetamiprid 20 SP @ 1.0 g/l water at 10 days interval, $T_{7:}$ Clipping of aphid infested twigs and spraying with Anaconda 50 EC (chlorpyriphos 45% + cypermethrin 5%) @ 1.0 ml/l water at 10 days interval, T_8: Clipping of aphid infested twigs and spraying with polytrin 44 EC (profenophos 40% + cypermethrin 4%) @ 1.0 ml/ l water at 10 days interval, T_9: Dimethoate 30 EC (farmers' practice), T_{10}: Control (untreated check)] were used with three replications. The standard agronomic practices were followed to raise the crop successfully. The crop was sown in last week of November. Application of the insecticides was carried

out with the help of hand-operated knapsack sprayer. The population of mustard aphid was augmented to achieve uniform infestation. Observations on the population of aphids were recorded at 3, 7 and 10 days after insecticidal application. For recording population count of aphids, 10 plants were randomly selected from each plot. Count was made on 10 cm top portion of the terminal shoots of each plant with the help of camel hair brush on a white paper sheet. Data on mean aphid population and yield were calculated and statistically analysed.

RESULTS and DISCUSSION

The results indicated that all the insecticidal treatments were significantly superior to untreated control in minimising aphid population. The data given in Table 1 show that after the first spray mean number of aphids on 10 cm terminal portion of shoots per plant was minimum (5.66 and 5.83) in treatments T_8 [Clipping of aphid infested twigs and spraying with polytrin 44 EC (profenophos 40% + cypermethrin 4%) @ 1.0 ml/ l water at 10 days interval] and T_7 [Clipping of aphid infested twigs and spraying with Anaconda 50 EC (chlorpyriphos 45% + cypermethrin 5%) @ 1.0 ml/l water at 10 days interval] respectively the latter being at par with treatment T_5 (Clipping of aphid infested twigs and spraying with thiacloprid 21.7 SC @ 0.25 ml/l water at 10 days interval) (7.26) whereas the maximum (14.62) was recorded in treatment T_{10} (Control: untreated check) followed by T_9 [Dimethoate 30 EC (farmers' practice)] (10.05).

After the second spray T_7 resulted in minimum number of aphids on 10 cm terminal portion of shoots per plant (3.27) which was followed by T_8 (4.52) and T_5 (4.62) the latter two being statistically at par in comparison to 10.34 in T_{10}.

In overall minimum (4.55 and 5.09) mean number of aphids on 10 cm terminal portion of shoots per plant was recorded in T_7 and T_8 respectively the two being at par in comparison to the 12.48 in T_{10} and 9.12 in case of T_9 treatments.

Maximum yield was recorded in T_7 and T_8 (13.68 and 12.56 q/ha respectively) the two being at par and the latter being at par with T_5 (11.72 q/ha) and

Table 1. Effect of different treatments on number of aphids and yield of mustard

Treatment	Mean number of aphids on 10 cm terminal portion of shoots/plant			Yield (q/ha)
	After 1st spray	After 2nd spray	Mean	
T_1	8.25 (2.96)	5.43 (2.44)	6.84 (2.71)	10.21
T_2	9.43 (3.15)	7.11 (2.96)	8.27 (2.96)	8.73
T_3	8.12 (2.94)	6.04 (2.55)	7.08 (2.75)	9.84
T_4	8.37 (2.98)	6.13 (2.57)	7.25 (2.78)	10.47
T_5	7.26 (2.79)	4.62 (2.26)	5.94 (2.53)	11.72
T_6	7.60 (2.85)	5.86 (2.52)	6.73 (2.69)	10.84
T_7	5.83 (2.52)	3.27 (1.94)	4.55 (2.24)	13.68
T_8	5.66 (2.48)	4.52 (2.24)	5.09 (2.36)	12.56
T_9	10.05 (3.24)	8.19 (2.95)	9.12 (3.10)	8.45
T_{10}	14.62 (3.89)	10.34 (3.29)	12.48 (3.60)	6.39
SEm±	0.097	0.089	0.072	0.516
$CD_{0.05}$	0.293	0.268	0.214	1.942

Figures in parentheses are square root transformed values, Data based on three replications

T_1: Alternate spray of thiomethoxam 25 WSG @ 0.25 ml/l and imidacloprid 17.852 SL @ 0.4 ml/l water at 10 days interval, T_2: Alternate spray of NSKE 5% and fenvolerate 10 EC @ 1.0 ml/l water at 10 days interval, T_3: Alternate spray of lufenuron 5 EC @ 1.0 ml/l and azadirachtin 0.15% @ 4.0 ml/l water at 10 days interval, T_4: Alternate spray of buprofezin 25 EC @ 1.0 ml/l and difentheuron 50 WP @ 1.0 g/l water at 10 days interval, T_5: Clipping of aphid infested twigs and spraying with thiacloprid 21.7 SC @ 0.25 ml/l water at 10 days interval, T_6: Clipping of aphid infested twigs and spraying with acetamiprid 20 SP @ 1.0 g/l water at 10 days interval, T_7: Clipping of aphid infested twigs and spraying with Anaconda 50 EC (chlorpyriphos 45% + cypermethrin 5%) @ 1.0 ml/l water at 10 days interval, T_8: Clipping of aphid infested twigs and spraying with polytrin 44 EC (profenophos 40% + cypermethrin 4%) @ 1.0 ml/l water at 10 days interval, T_9: Dimethoate 30 EC (farmers' practice), T_{10}: Control (untreated check)

T_6 (Clipping of aphid infested twigs and spraying with acetamiprid 20 SP @ 1.0 g/l water at 10 days interval) (10.84 q/ha) as compared to 6.39 q/ha in control.

Similar trends in the incidence of the insect pests were observed by Mohapatra and Sahu (2006) who reported that insecticidal combination products of phoscpa 280C were most effective treatment which recorded the lower bollworm infestation and higher cotton seed yield.

CONCLUSION

The study showed that the aphid infestation is one of the limiting factors in producing higher seed yield in mustard. Clipping of aphid-infested twigs and spraying with insecticidal combination products of Anaconda 50 EC (chlorpyriphas 45% + cypermethrin5%) @ 1.0 ml/l water at 10 days interval proved to be the most effective treatment to curtail the aphid and minimize the loss of yield in comparison to rest of the treatments.

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