

Integrated pest management for aphid in lucerne

G.R. GOLAGE, S.R. GOSAVI AND S.M. WANKHEDE



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See end of the article for authors' affiliations

Correspondence to :

S.R. GOSAVI

Department of
Entomology, Mahatma
Phule Krishi
Vidyapeeth, Rahuri,
AHMEDNAGAR
(M.S.) INDIA

SUMMARY

Studies on bioefficacy of different IPM treatments against aphids revealed that thiamethoxam (0.005 %) as a component of IPM III showed nil aphid population at 7 days after application with maximum green forage yield of lucerne. *Verticillium lecanii* 4×10^5 cfu ml⁻¹ (IPM II) recorded 10.63 aphids/tiller at 7 days after application with maximum green forage yield (122.38 q ha⁻¹) of lucerne.

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Key words :

IPM, *Verticillium lecanii*, Lucerne, Aphid

Lucerne (*Medicago sativa* L.) some times called 'queen of forage crops', is one of the oldest cultivated fodder crops and in India Lucerne is the highest in feeding value of all commonly grown hay crops. Lucerne mainly suffers damage both qualitatively and quantitatively by aphids, *Acyrtosiphon pisum* Harris, *Acyrtosiphon kondoi* Shinjii and *Therioaphids trifolii f. maculata*. The green fodder yield losses was reported to be 33 per cent in lucerne due to aphid in new Mexico (Melton and Wilson, 1989). In Maharashtra, spotted aphid, pea aphid and cowpea aphid are found major pest on lucerne (Anonymous, 2004).

No work seems to have been done on any aspect of pests infesting lucerne in Maharashtra. It is fodder with frequent cutting system, highly persisted insecticides are undesirable. Considering the importance of the crop and losses caused by the pest, the present investigation was undertaken.

MATERIALS AND METHODS

The research work was carried out on the farm of AICRP on Forage Crops, MPKV, Rahuri, Dist. Ahmednagar (M.S.) from November, 2007 to May, 2008. Four

treatments and fifteen replications were used in Randomized Block Design. Details of treatment applications are mentioned below:

Treatment details:

T₁ : IPM module I :

- Seed treatment of *Trichoderma viride* (5 g/kg seed)
- Transplanting of marigold seedling 0.5 m apart around and inner border in lucerne field 1 month after sowing.
- Seedling of castor seed 3 m part around and inner border area of lucerne field at the time of sowing.
- Spraying of *HaNPV* or *S/NPV* @ 250 LE/ha at the appearance of 2 larvae/sq.mt. of respective pest.
- Spraying of NSE 5 % for sucking and lepidopteran pests.
- Placement of 'T' shaped bird perches (15/ha).

T₂ : IPM module II :

- Seed treatment of *Trichoderma viride* (5 g/kg seed).
- Spraying of *Verticillium lecanii* (4 x 10⁵ c.f.u./ml) for the management of aphids.
- Spraying of *B.t.* @ 1 kg/ha at the

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Table 1 : Aphid population as influenced by application of two spray schedule of different IPM treatments

Tr. No.	Treatments	Av. no. of aphids/tiller days after treatment (average of 2 sprays)			Green forage yield (q ha ⁻¹)
		2 DAS	5 DAS	7 DAS	
T ₁	IPM I	28.06 (5.34)	21.41 (4.66)	25.99 (5.10)	103.07
T ₂	IPM II	41.24 (5.82)	21.26 (4.31)	10.63 (3.12)	122.38
T ₃	IPM III	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	134.14
T ₄	Untreated control	80.75 (9.03)	81.43 (9.07)	81.21 (9.06)	83.89
	S.E. ±	0.09	0.09	0.09	0.54
	C.D. (P=0.05)	0.26	0.26	0.26	1.53

Figures in parentheses are $\sqrt{n+1}$ transformed value

appearance of 2 larvae/sq.mt.

- Spraying of *HaNPV* or *SINPV* @ 250 LE ha⁻¹ at the appearance of 2 larvae/sq.mt. of respective pest.
- Placement of ‘T’ shaped bird perches (15/ha).

T₃ : IPM module III :

- Seed treatment of *Trichoderma viride* (5 g/kg seed).
- Spraying of thiamethoxam 25 WG @ 0.005 % for management of aphids.
- Spraying of *HaNPV* or *SINPV* @ 250 LE ha⁻¹ at the appearance of 2 larvae/sq.mt. of respective pest.
- Release of *Trichogramma chilonis* @ 1,00,000 adults/ha/ week synchronizing the first release with the appearance of *H. armigera* larvae (minimum two release).
- Placement of ‘T’ shaped bird perches (15/ha).

T₄ : Untreated control plot:

The observations on the number of aphids were recorded on five randomly selected tillers per replication for each treatment. Insecticidal treatments were given as soon as infestation of aphids appeared on the crop. The pretreatment count was recorded before application of spray and post treatment counts were taken at 2, 5 and 7 days after insecticidal application (DAS). Pre and post treatment count of lady bird beetle (LBB) were taken on five randomly selected tillers per replication at 2, 5 and 7 days after insecticidal application. Finally, treatment wise yield of green forage was recorded. Thus, the generated data on aphids were subjected to statistical analysis and the efficacy of the IPM treatments was assessed.

RESULTS AND DISCUSSION

Data in respect of average survival population of aphids as influenced by application of two sprays of different IPM treatments are given in Table 1. It is

revealed that treatment with thiamethoxam (0.005 %) as a component of IPM III recorded nil count of aphids/ tiller at 2, 5 and 7 days after spray treatment. Next promising treatment was *V. lecanii* 4 x 10⁵ cfu ml⁻¹ (IPM II) it recorded 41.24, 21.26 and 10.63 aphids/tiller at 2, 5 and 7 days after spray treatment, respectively.

However, count of aphids/tiller in untreated control was 80.75, 81.43 and 81.21 at 2, 5 and 7 days, respectively. Neem seed extract 5 % (IPM I) was found moderately effective against lucerne aphids as it recorded 28.06, 21.41 and 25.99 aphids/tiller at 2, 5 and 7 days after spray treatment, respectively. Tambe (2008) studied residues of thiamethoxam 0.005 % and reported that pre-harvest interval of thiamethoxam was 15 days. Hence, the care should be taken to avoid the effect of toxic chemicals in food chain. Several research worker showed the effectiveness of *V. lecanii* against aphids (Yeo *et al.*, 2003 and Neelam *et al.*, 2003). Moderate efficacy of neem based insecticide was reported by Koul (1999).

Average data of two sprays on lady bird beetles

Table 2 : Effect of IPM modules on survival population of lady bird beetle (grubs) on lucerne

Tr. No.	Treatments	Av. no. of lady bird beetle grubs/ tiller days after treatment (average of 2 sprays)		
		2 DAS	5 DAS	7 DAS
T ₁	IPM I	1.91 (1.70)	1.66 (1.62)	1.87 (1.66)
T ₂	IPM II	2.01 (1.73)	2.02 (1.71)	1.98 (1.69)
T ₃	IPM III	0.73 (1.28)	0.15 (1.07)	0.00 (1.00)
T ₄	Untreated control	2.73 (1.92)	3.25 (2.06)	3.57 (2.13)
	S.E. ±	0.04	0.04	0.04
	C.D. (P=0.05)	0.11	0.13	0.12

Figures in parentheses are $\sqrt{n+1}$ transformed value

(grubs) population (Table 2) indicated that untreated control showed significantly higher number of grubs of LBB/tiller at 2, 5 and 7 days after treatment. The safer treatments were *V. lecanii* 4 x 10⁵ cfu ml⁻¹ (IPM II) and NSE 5 % (IPM I) which recorded 2.01 and 1.91 lady bird beetles/tiller at 2 days after spray and 1.98 and 1.87 LBB/tillers at 7 days after spray. Biopesticide and neem based insecticides were found safer to predatory LBB (Chambers and Helyer, 1988 and Helyer, 1993).

Authors' affiliations:

G.R. GOLAGE, Department of Entomology, College of Agriculture, College of Agriculture, PUNE (M.S.) INDIA
S.M. WANKHEDE, Department of Entomology, Mahatma Phule Krishi Vidyapeeth, Rahuri, AHMEDNAGAR (M.S.) INDIA

REFERENCES

- Anonymous (2004)**. Annual Report Part-2 *Rabi* 2001-02. AICRP on Forage Crops, IGFRI, Jhansi, September, 2004. pp. 47-65.
- Chambers, D. and Helyer, N.L. (1988)**. Recent research work on aphid control under glasshouse. Institute Report on 1987-88 from GCRI, London, U.K.
- Helyer, N.L. (1993)**. *Verticillium lecanii* for control of aphids and thrips on cucumber. IOBC/WPRS Bull., **13** : 63-66.
- Koul, O. (1999)**. Insect regulatory and antifeedant effects of neem extract and azadirachtin on two aphid species on ornamental plant. *J. Bio. Sci.*, **24**(1): 85-96.
- Melton, B. and Wilson, M. (1989)**. Registration of "Wilson alfalfa". *Crop Sci.*, **29**(2): 486.
- Neelam, J., Brar, K.S., Maninder, S., Joshi, N. and Shenhmar, M. (2003)**. Preliminary evaluation of *Verticillium lecanii* (Zimm.) viegas against mustard aphid, *Lipaphis erysimi* (Kalt.). *Insect. Environ.*, **9**(3): 106-107.
- Tambe, A.B. (2008)**. Studies on management of pests infesting lucerne, *Medicago sativa* L. Ph.D. Thesis, Mahatma Phule Krishi Vidyapeeth, Rahuri, M.S. (India).
- Yeo, H., Pell, J.K., Alderson, P.G., Clark, S.J. and Pye, B.J. (2003)**. Laboratory evaluation of temperature effects on the germination and growth of entomopathogenic fungi and their pathogenicity to two aphid species. *Pest Management Sci.*, **59**(2): 156-160.
