

Performance of some IPM modules on *Spodoptera litura* and *Helicoverpa armigera* in lucerne



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

International Journal of Plant Protection, Vol. 4 No. 1 (April, 2011) : 217-219

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

The field experiment was conducted on lucerne crop at MPKV, Rahuri from November, 2007 and May, 2008 to find out effective eco-friendly IPM modules for management of lucerne pests. Among the IPM modules tested against *Spodoptera litura*, IPM II (*B.t.* 0.1 % + bird perches) was found significantly superior over other IPM modules at 7 days after treatment. Whereas, IPM I (Trap crop + *SINPV* + bird perches) and IPM III (*SINPV* + bird perches) proved to be equally effective against *Spodoptera litura* and production of green forage yield. IPM II (*B.t.* 0.1 % + bird perches) and IPM I (Trap crop + *HaNPV* + bird perches) showed less than 1 larva/m² of *Helicoverpa armigera* at 7 days after average of two treatment scheduled. IPM II recorded highest seed yield (4.05 q ha⁻¹) of lucerne followed by IPM I and IPM III.

Golage, G.R., Gosavi, S.R. and Wankhede, S.M. (2011). Performance of some IPM modules on *S. litura* and *H. armigera* in lucerne. *Internat. J. Pl. Protec.*, 4(1): 217-219.

Key words : *S. litura*, *H. armigera*, *Medicago sativa*, IPM

Lucerne (*Medicago sativa* L.) sometimes called, 'queen of forage crops,' is one of the oldest among cultivated fodder crops. Lucerne is the highest in feeding value of all commonly grown hay crops. It contains 20.2 % crude protein, 16.2 % digestible crude protein, 30.1 % crude fibre, 1240 g calcium/100 kg, 350 g phosphorus/100 kg lucerne and metabolic energy 2.17 M cal./kg (Banerjee, 1978). The quantitative losses recorded in India is about 37.7 % due to insect pests in lucerne (Shri Ram and Gupta, 1989). No work seems to have been done on any aspect of pest infesting lucerne in Maharashtra, though it is major green leguminous nutritive fodder. It is fodder with frequent cutting systems, highly persisted insecticides are undesirable. Considering the importance of the crop and losses caused by the pest, the present investigation was undertaken to manage the major pests of lucerne with IPM modules.

MATERIALS AND METHODS

The experiment was carried out on the farm of AICRP on Forage Crops, MPKV, Rahuri, Dist. Ahmednagar (M.S.) during the

November, 2007 to May, 2008 in Randomized Block Design with fifteen replication and four treatments. The treatment details are mention 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 *SINPV* @ 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.

Received :
December, 2010
Accepted :
March, 2011

- Spraying of *B.t.* @ 1 kg/ha at the 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 : PM 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 *Helicoverpa armigera* larvae (minimum two release).
- Placement of ‘T’ shaped bird perches (15/ha).

T₄ : Untreated control plot:

Insecticidal treatments were given as soon as infestation of larvae appeared on crop. Spray was given at evening time. Pre-count was taken before spray and post treatment counts were taken on survival larvae population/m² from 3 spots/replication at 2, 5 and 7 days after treatment (DAT). The green forage yield of lucerne

from each treatment plot was recorded at cutting of separately and seed yield harvested from each treatment plot was recorded separately. Thus, the data generated were subjected to statistical analysis and the efficacy of the IPM treatment was assessed.

RESULTS AND DISCUSSION

The Table 1 revealed that the IPM II recorded significantly lower 1.35, 0.77 and 0.32 larvae per square meter on lucerne than other treatments at 2nd, 5th and 7th days, respectively. Next promising treatment were IPM I and IPM III which exhibited 2.46, 1.24, 0.52 and 2.61, 1.36, 0.62 larvae/sq.mt. at 2nd, 5th and 7th days, respectively. *Bacillus thuringiensis* and *SINPV* proved to be equally effective against *Spodopoptera litura* and for obtaining green forage yield. Srivastava and Srinivas Reddy (2006) showed the effectiveness of these insecticides against *Spodopoptera litura*. The highest green forage yield of lucerne was obtained in treatment IPM II (115.94 q ha⁻¹). However, treatment with IPM I (111.26 q ha⁻¹) and IPM III (110.07 q ha⁻¹) were at par with it.

Among the different IPM modules (Table 2) IPM II showed 0.48, 0.22 and 0.12 significantly lower number of larvae of *Helicoverpa armigera* /m² at 2, 5 and 7 days

Table 1 : Effect of IPM modules on survival of larval population of *S. litura* on lucerne

Tr. No.	Treatments	Av. survival population of <i>S. litura</i> larvae/m ² days after treatment (average of 2 sprays)			Green forage yield (q ha ⁻¹)
		2 DAS	5 DAS	7 DAS	
T ₁	IPM I	2.46 (1.82)	1.24 (1.48)	0.52 (1.22)	111.26
T ₂	IPM II	1.35 (1.52)	0.77 (1.32)	0.32 (1.14)	115.94
T ₃	IPM III	2.61 (1.87)	1.36 (1.52)	0.62 (1.27)	110.07
T ₄	Untreated control	5.63 (2.57)	5.72 (2.59)	5.98 (2.64)	56.02
	S.E. ±	0.06	0.04	0.05	2.12
	C.D. (P=0.05)	0.17	0.11	0.15	6.04

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

Table 2 : Effect of IPM modules on survival of larval population of *H. armigera* on lucerne

Tr. No.	Treatments	Av. survival population of <i>H. armigera</i> larvae/m ² days after treatment (average of 2 sprays)			Seed yield (q ha ⁻¹)
		2 DAT	5 DAT	7 DAT	
T ₁	IPM I	1.60 (1.59)	0.48 (1.20)	0.32 (1.14)	4.01
T ₂	IPM II	0.48 (1.20)	0.22 (1.10)	0.12 (1.05)	4.05
T ₃	IPM III	1.61 (1.60)	1.04 (1.42)	1.17 (1.47)	3.70
T ₄	Untreated control	3.15 (2.03)	3.66 (2.15)	4.09 (2.24)	2.66
	S.E. ±	0.03	0.02	0.03	0.07
	C.D.(P=0.05)	0.09	0.06	0.09	0.19

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

after treatment.

Next effective IPM modules in order to their merits were IPM III (1.61 larvae/m²) and IPM I (1.60 larvae/m²) at 2 DAT. Bird perches was found to be very effective against *Helicoverpa armigera* (Ghode *et al.*, 1988). However, *HaNPV* and *B.t.* were found effective against larvae of *Helicoverpa armigera* at 2 to 7 days after spray (Singh and Yadav, 2006). Neem based insecticides showed moderate effect on *Helicoverpa armigera* larvae (Visalakshmi *et al.*, 2005). Shri Ram and Gupta (1989) reported that combination of cultural, chemical and biological methods managed lucerne pest effectively.

The IPM II recorded significantly higher seed yield (4.05 q ha⁻¹) of lucerne. However, it was at par with IPM I which recorded 4.01 q ha⁻¹ seed yield of lucerne due to treatments.

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

- Banerjee, G.C. (1978).** Principles of animal nutrition and feeding practices. Chpt., *Animal Feed stuffs*, pp. 1-20.
- Ghode, M.K., Nayak, U.K., Ghosh, P.K. and Pawar, A.O. (1988).** Avian predation of gram pod borer (*Heliothis armigera*) in Orissa. *J. Adv. Zoology*, **9** (2) : 148.
- Shri Ram and Gupta, M.P. (1989).** Integrated pest management in lucerne (*Medicago sativa* L.) and its economics in India, *fusarium* disease in the tropics, **36**(3): 258-262.
- Singh, S.S. and Yadav, S.K. (2006).** Efficacy and economics of some modern insecticides, biopesticides and neem based formulations against pod borer, *Helicoverpa armigera* in pigeonpea. *Indian J. Ent.*, **68**(2): 139-143.
- Srivastava, Chitra and Srinivas Reddy, D. (2006).** Evaluation of antifeedant activity of neem formulations against tobacco caterpillar, *Spodoptera litura*, *Indian J. Plant Prot.*, **34**(1): 126-128.
- Visalakshmi, V., Ranga Rao, G.V. and Arjun Rao, P. (2005).** Integrated pest management strategy against *Helicoverpa armigera* Hubner in chickpea. *Indian J. Pl. Prot.*, **33** (1) : 17-22.
