

Integrated management of gram pod borer, *Helicoverpa armigera* (Hubner)

T.B.UGALE*, VRUSHALI L. BEDSE AND N.R. TOKE

Department of Agricultural Entomology, K.K. Wagh College of Agriculture, NASHIK (M.S.) INDIA

(Email : id-tushargrapes@gmail.com)

ABSTRACT

The experiment on integrated management of *H. armigera* infesting chickpea was conducted during *Rabi* season of 2008-2009 at the Instructional Farm of Karmaveer Kakasaheb Wagh College of Agriculture, Nashik on two varieties viz., Digvijay and Vihar with the main object to demonstrate farmers regarding the impact of IPM strategy in management of the pest. It was observed that the average incidence of *H. armigera* in IPM block was 9.30 and 9.60 per cent as against 16.50 and 15.45 per cent in conventional method (chemical control) block in the varieties Vihar and Digvijay, respectively, which indicated that there was 43.63 and 37.86 per cent reduction in pest incidence in the respective varieties due to adoption of IPM strategy. Similarly, there was 39.27 and 34.68 per cent increase in yield in IPM block as compared to conventional method block of the respective varieties. The gross monetary returns were to the tune of Rs.42900/- and Rs.38940/- per hectare in case of IPM block as compared to Rs.31920/- and Rs.27960/- in conventional method of pest control in the varieties Vihar and Digvijay, respectively. The net monetary returns were Rs.39562/- and Rs.35299/- in IPM block as against Rs.29284/- and Rs.25187/- in conventional block in the respective varieties. Thus, there was net benefit of Rs.10278/- and Rs.10112/- in the Vihar and Digvijay varieties of gram due to adoption of IPM strategies. However, there was negligible increase in C:B ratio in IPM as compared to conventional method taking into consideration of plant protection inputs only due to the addition expenditure in IPM block.

Ugale, T.B., Bedse, Vrushali L. and Toke, N.R. (2011). Integrated management of gram pod borer, *Helicoverpa armigera* (Hubner). *Internat. J. agric. Sci.*, 7(2): 333-335.

Key words : *Sclerotium rolfsii*, Groundnut, Association analysis, Superior segregants

INTRODUCTION

Helicoverpa armigera (Hubner) is commonly referred as gram pod borer, American bollworm, tomato fruit borer, etc. according to the crop it infests. It has global distribution, widely distributed in Europe, Africa, Asia and South Pacific regions (Reed and Pawar, 1982). It is highly polyphagous pest causing damage to the various groups of crops over 360 plant species including the crop plants like cotton, maize, sorghum, sunflower, tomato, okra and legumes etc. (Singh and Singh, 1975). On an average 30 per cent losses in yield of gram have been reported. It has been estimated that a single caterpillar destroys 30-40 pods of gram in its life time. In severe infestation, damage may be caused from 20 to 50 per cent (Singh, 2010).

Indiscriminate pesticide use for the control of this pest on various crops has led to resurgence and resistance problems apart from the other harmful effects on the environment, hence, there is a need for eco-friendly options like biocontrol, integrated pest management (IPM), etc. This paper provides a case study of current research initiative focused on the demonstration for management of *H. armigera* in chickpea through the use of eco-friendly methods with the main object to

demonstrate the students of the college and visiting farmers regarding the impact of IPM strategy in management of the pest.

MATERIALS AND METHODS

The experiment on integrated management of *H. armigera* infesting chickpea was conducted during *Rabi* season of 2008-2009 at the Instructional Farm of Karmaveer Kakasaheb Wagh College of Agriculture, Nashik (M.S.) on two varieties viz., Digvijay and Vihar comprising of 1200 m² block with IPM and conventional (chemical) method of pest control separately with proper isolation from each other comprising of following strategy.

IPM block :

- Sowing of sorghum seed (cv. M.35-1) @ 100g/ha. (mix crop) as live bird perchers.
- Providing wooden cross sticks @ 50/ha. as bird perchers.
- Use of pheromone traps (Helilures) right from 15 days after germination, replacing the lures after every 21 days up to harvest of the crop @ 10/ha.
- Timely collection and destruction of larvae of the pest.

* Author for correspondence.

- Spraying of NSKE 5% at the time of initiation of incidence of pest.
- Subsequent three sprays at an interval of 21 days with the pesticides viz., HaNPV 250 LE (Heliokill) and NSKE 5% alternately.

Chemical control method block:

Application of recommended pesticidal sprays starting from initiation of pest incidence at an interval of 21 days by adopting following sequence.

- HaNPV (Heliokill) 250 LE
- Endosulfan 35 EC 0.05%
- Quinalphos 25EC 0.05%
- Endosulfan 35 EC 0.05%

Other agronomical practices like seed rate (75kg/ha.), nutritional dose (N:P:K @ 25:50:0 kg/ha), seed treatment with trichoderma (5g/kg of seed), irrigation, weeding, interculturing etc. as per requirement were common for both the blocks.

Observations were recorded before harvesting by counting the infested pods by pod borer and healthy pods on randomly selected 100 plants from each block. Average per cent infested pods in each block were worked out. Similarly, the yield of each block was recorded at harvest and converted on hectare basis. The cost of inputs pertaining to plant protection strategies was worked out. The net profit and cost benefit ratio was worked out taking into consideration of the plant protection inputs only.

RESULTS AND DISCUSSION

The results of the present study as well as relevant discussion have been presented under the following sub heads:

Pest incidence:

It is revealed from the Table 1 that the average incidence of *H. armigera* in IPM block was 9.30 and 9.60 per cent as against 16.50 and 15.45 per cent in conventional (chemical control) method block in the varieties Vihar and Digvijay, respectively which indicated that there was 43.63 and 37.86 per cent reduction in pest incidence in these varieties due to adoption in IPM strategy. Similarly, there was 34.68 and 39.27 per cent increase in yield in IPM block as compared to conventional block of the respective varieties.

Monetary benefits :

The data presented in Table 2 and Table 3 indicated that the gross monetary returns were to the tune of Rs.42900/- and Rs.38940/- per hectare in case of IPM block as compared to Rs.31920/- and Rs.27960/- in conventional method of pest control in the varieties Vihar and Digvijay, respectively. The net monetary returns were Rs.39562/- and Rs.35299/- in IPM block as against Rs.29284/- and Rs.25187/- in conventional block in the respective varieties. Thus, there was net benefit of Rs.10278/- and Rs.10112/- in the Vihar and Digvijay

Table 1: Incidence of *H. armigera* and the yield of gram

Pest control strategy	Pest incidence (Av. % infested pods)*		Grain yield (q/ha)**	
	cv. VIHAR	cv. DIGVIJAY	cv. VIHAR	cv. DIGVIJAY
IPM strategy	9.30 (43.63)	9.60 (37.86)	14.33 (34.68)	19.47 (39.27)
Chemical control method	16.50	15.45	10.64	13.48

* Figures in parentheses are per cent reduction in pest population and

** per cent increase in grain yield over chemical control

Table 2: Gross monetary returns and expenditure on plant protection for *H. armigera*

Particulars	Gross monetary returns (Rs./ha)		Expenditure on plant protection (Rs./ha)	
	cv. VIHAR	cv. DIGVIJAY	cv. VIHAR	cv. DIGVIJAY
IPM strategy	42900.00	38940.00	3428.00	3641.00
Chemical control method	31920.00	27960.00	2611.00	2773.00

Table 3: Economical benefit due to IPM and chemical method of control of *H. armigera*

Particulars	Net monetary returns (Rs./ha)*		C:B ratio	
	cv. VIHAR	cv. DIGVIJAY	cv. VIHAR	cv. DIGVIJAY
IPM strategy	39562.00 (10278)	35299.00 (10112)	1:11.54	1:10.69
Chemical control method	29284.00	25187.00	1:11.19	1:9.08

* Figures in parentheses are additional monetary benefits in IPM block over chemical method of pest control

varieties of gram due to adoption of IPM strategies. However, there was negligible increase in C:B ratio in IPM as compared to conventional (chemical treatment) block taking into consideration of plant protection inputs only due to the addition expenditure in IPM block.

According to Cowgill and Bhagwat (1996) quinalphos had a greater effect on the density of large *H. armigera* larvae on susceptible genotypes than on the resistant genotype (ICC 506). Similarly, NPV had greater effect on the density of large larvae on susceptible genotypes than on resistant variety viz., ICC 506. The yields of NPV-treated susceptible genotypes were significantly greater than those in the quinalphos treatment or control. Ahmad and Chandel (2004) conducted large scale demonstration trials on IPM of *H. armigera* and reported that the treated plots including *HaNPV* gave 36% increase in yield (ranging between 32.0 to 38.6%). The present findings are in conformity with these results reported by earlier research workers.

REFERENCES

- Ahmad, R. and Chandel, S. (2004).** Farmers field evaluation of IPM module against *H. armigera* infesting chickpea. *Arch. Phytopathol. & Plant Prot.*, **37**(2): 133-137.
- Cowgill, S.E. and Bhagwat, V.R. (1996).** Comparison of the efficacy of chemical control and *HaNPV* for the management of *Helicoverpa armigera* (Hübner) on resistant and susceptible chickpea. *Crop Protection*, **15**(3):241-246.
- Reed, W. and Pawar, C.S. (1982).** Heliothis: A global problem. In: Proc. Int. Workshop Heliothis management. ICRISAT, Patancheru, India. 9 pp.
- Singh, J.V. (2010).** Gram pod borer. *Epithets in Agriculture*.
- Singh, H. and Singh, G. (1975).** Biological studies on *Heliothis armigera* (Hubner) in Punjab. *Indian J. Ent.*, **37**: 154-164.

Received : February, 2011; Accepted : May, 2011