Environment & Ecology 29 (1A) : 280—281, 2011
 ISSN 0970-0420

Bioefficacy of New Insecticides Against *Helicoverpa armigera* on Chickpea Crop

R. MAHENDRA, C. S. JAGADEESH BABU, Y. S. BASANTH AND R. GIRISH*

Department of Agricultural Entomology, University of Agricultural Sciences
GKVK, Bangalore 560065, India
E-mail : giriento@rediffmail.com
**Correspondence*

Abstract

A field experiment was carried out during 2005-2006 with seven different treatments along with untreated check to asses the efficacy of new insecticides against *H. armigera.* Among them spinosad (0.006%) and indoxacarb (0.007%) were proved to be effective, which were followed by emamectin benzoates (0.001%), flubendiamide (0.004%) and novaluron (0.0075%) in reducing the larval population as compared to endosulfan (0.07%) and untreated check.

Key words : *Helicoverpa armigera*, Chickpea, Insecticides, Larval population.

Chickpea *Cicer arietinum* (L.) is one of the important pulse crop grown during *rabi* season. On an average, it produces 126 kg protein from one hectare and is probably the highest protein-yielding legume naxt to groundnut and soybean. Among the various pulses, chickpea ranks first in area (27.0%) and production 38.0%). It occupies an area of 4.80 million hectares with a production of 3.50 million tonnes, averaging the productivity at 720 kg/ha (1). The major chickpea growing districts of the Karnataka state includes Bellary, Bidar, Bijapur, Dharwad, Gulbarga and Raichur. Low yield of chickpea is mainly attributed to the periodic outbreak of the pod borer, *H. armigera.* Annual crop loss due to *H. armigera* in India is estimated around Rs. 2000 crores,inspite of use of insecticides worth of nearly Rs 500 crores (2). Chickpea is one of the most preferred hosts of *H. armigera.* The pest attacks the crop not only during pre-flowering stage as defoliator but also at the reproductive stage. To combat the pest problem and sustain the production potential of the newly released high yielding varieties in the country, more emphasis was given to chemical suppression of the pest during past decades. Therefore, the present study was taken up to evaluate the new insecticides for their effectiveness against pod borer.

Methods

The investigations were carried out under field condition at ZARS, GKVK, during *kharif* of 2005. The trials were laid out in a randomized block design with three replications. Individual plot size was 8 m^2. Chickpea variety Annigeri-1 was used with 30 × 10 cm spacing and 1 m gap was given between each treatment block. The crop was raised by following the recommended package of practices. Seven treatments including untreated check were maintained. The treatments were : T_1—Indoxacarb 14.5 SC (0.007%), T_2—Flubendiamide 20 WDG (0.004%), T_3—Novaluron 10 EC (0.0075%), T_4—Emamectin benzoate 5 SG (0.001%), T_5—Spinosad 45 SC (0.006%), T_6—Endosulfan 35 EC (0.07%) (standard check), and T_7—Control (untreated check).

Results and Discussion

Among different treatments evaluated for their efficacy, spinosad treated plot was found to be superior at 14 days after first, second and third spray, by recording 0.56, 0.43 and 0.13 larvae per plant, respectively which was followed by indoxacarb 14.5 SC, which recorded 0.66, 0.53, 0.20 larvae per plant, respectively. The treatments emamectin benzoate, flubendiamide, novaluron and endosulfan recorded 0.76, 0.93, 1.06 and 1.36 larvae per plant 9 days after first spray and 0.60, 0.66, 0.73 and 1.20 larvae per plant 9 days after second spray and 0.33, 0.40, 0.56 and 0.93 larvae per plant, respectively, 9 days after third spray

Table 1. Bioefficacy of new insecticides against *H. armigera* in chickpea. *Significant at P=0.05. Means followed by same letters in column are not significantly different by DMRT. (1) DAS—Days after first spray, (2) DAS—Days after second spray, (3) DAS—Days after third spray.

Treatments	Concentration (%)	Precount	Number of larvae per plant								
			3 DAS[1]	6 DAS[1]	9 DAS[1]	3 DAS[2]	6 DAS[2]	9 DAS[2]	3 DAS[3]	6 DAS[3]	9 DAS[3]
Indoxacarb	0.007	1.93	0.73^{ab}	0.70^{a}	0.66^{ab}	0.63^{a}	0.60^{ab}	0.53^{ab}	0.46^{ab}	0.30^{ab}	0.20^{a}
Flubendiamide	0.004	1.96	1.06^{bc}	0.96^{ab}	0.93^{bc}	0.86^{ab}	0.70^{bc}	0.66^{bc}	0.60^{bc}	0.53^{bc}	0.40^{ab}
Novaluron	0.0075	1.93	1.26^{c}	1.16^{b}	1.06^{c}	0.93^{b}	0.83^{c}	0.73^{c}	0.66^{c}	0.60^{c}	0.56^{b}
Emamectin benzoate	0.001	1.96	1.03^{bc}	0.90^{ab}	0.76^{abc}	0.73^{a}	0.66^{bc}	0.60^{bc}	0.53^{bc}	0.40^{bc}	0.33^{ab}
Spinosad	0.006	1.96	0.66^{a}	0.60^{a}	0.56^{a}	0.53^{a}	0.50^{a}	0.43^{a}	0.33^{a}	0.26^{a}	0.13^{a}
Endosulfan	0.07	1.96	1.53^{d}	1.46^{c}	1.36^{d}	1.33^{c}	1.30^{d}	1.20^{d}	1.10^{d}	1.03^{d}	0.93^{c}
Control		1.96	2.36^{c}	2.43^{d}	2.46^{e}	2.56^{d}	2.60^{c}	2.63^{e}	2.76^{e}	2.73^{e}	2.50^{d}
F-test			•	•	*	*	*	*	*	*	*
SE ±		NS	0.101	0.097	0.096	0.098	0.083	0.083	0.081	0.082	0.073
CD at 5%			0.313	0.299	0.298	0.304	0.257	0.258	0.252	0.254	0.226

(Table 1).

Dandale et al. (3) reported that spinosad (75 and 50 g a.i./ha) was effective in reducing the larval population of cotton bollworm. Similarly, Dhawan and Simwat (4) evaluated indoxacarb (80 g a.i./ha) against American bollworm which gave better control of larval population. Kumar and Devappa (5) indicated that emamectin benzoate (150 and 200 g /ha) was found to be effective in reducing the larval population of diamond back moth in cabbage. The results of this experiment were similar to these workers findings.

Therefore, it was concluded that among the different new insecticide, spinosad and indoxacarb were proved to be effective, which were followed by emamectin benzoates, flubendiamide and novaluron in reducing the larval population as compared to endosulfan and untreated check.

References

1. Anonymous. 2003. All India, production and yield of redgram. In : Area, production and yield of principle crops. Pp. 84—86. *In Agricultural statistics*. Min. Agric., Govt India, New Delhi, India.
2. Pawar C. S. 1998. *Helicoverpa*—A national problem which needs a national policy and commitment for its management. *Pestology* 22 : 51—57.
3. Dandale H. G., N. G. Rao, S. N. Tikar and S. A. Nimbalkar. 2000. Efficacy of spinosad against cotton bollworms in comparison with some synthetic pyrethroides. *Pestology* 24 : 6—8.
4. Dhawan A. K. and G. S. Simwat. 2000. Evaluation of indoxacarb for the control of bollworm complex and its impact on population of sucking pests and beneficial arthropods in cotton ecosystem. *Pestology* 24 : 15—20.
5. Kumar P. and U. Devappa. 2006. Bio-efficacy of proclaim 5 per cent SG against diamond back moth in cabbage. *Pestology* 30. (Inpress).