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# Evaluation of New Insecticides Against *Helicoverpa armigera* on Pigeonpea Crop

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**Abstract**

A field experiment was carried out during 2005-2006. Seven different treatments along with untreated check were evaluated and the efficacy of new insecticides against *H. armigera* was recorded. 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,* Pigeonpea, Insecticides, Larval population.**

Pigeon pea, *Cajanus cajan* (L.) Millsp. is an important pulse crop widely cultivated in the Indian subcontinent . It accounts for almost 90% of the worlds cultivated area of pulses. It provides a rich sources of vegetable protein to the human diet. It also maintains the soil fertility by biological nitrogen fixation. Globally gross area under pigeonpea is 42.6 lakh ha, with a total production of 30.53 lakh metric tonnes and a productivity of 716.50 kg/ha. In India, it accounts for an area of 32 lakh ha with a production of 22.40 lakh metric tonnes and a productivity of about 700 kg/ha (1). In Karnataka, it accounts for an area of 4.80 lakh ha with a production of 2.80 lakh tonnes and productivity of 618 kg/ha (1). It is largely grown in Gulbarga, Bidar, Raichur, Bellary, Dharwad, Bijapur as a sole crop and in Belgaum, Mysore, Tumkur, Kolar, Chitradurga and Bangalore districts as a mixed crop. Among the biotic and abiotic factors responsible for low yields of pigeonpea, insect pests are the major ones. Though the pest spectrum of pigeonpea crop includes 200 species of insects and mites, the major insect pests causing heavy yield loss to the crop are considered to be the pod borer, *Helicoverpa armigera* (Hubner) and pod fly, *Melanagromyza obtusa* (Malloch). These pests cause damage by boring into the flower buds, flowers and pods. The other important non-insect pest in mite, *Aceria cajani* (Channabasavanna), which is a vector of sterility mosaic virus disease (2,3). Of these, the gram prod borer, *H. armigera* is the most serious, cosmopolitan pest attacking more than 182 host plants belonging to 47 botanical families in the Indian subcontinent (4). Upto 90% yield loss in pigeonpea was reported byYelsheytty and Siddegowda (5) in Karnataka. 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* 2005. The trials were laid out in randomized block design with three replications. Individual plot size of pigeonpea was 15 $m^2$. Pigeonpea variety TTB-7 was used with 60 × 20 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 cheeck).

**Table 1.** Evaluation of new insecticides against *H. armigera* in pigeonpea. *-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 (%) | Pretreatment count | Number of larvae per plant 3 DAS | 7 DAS[1] | 14 DAS[1] | 3DAS[2] | 7DAS[2] | 14DAS[2] | 3DAS[3] | 7DAS[3] | 14DAS[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indoxacarb | 0.007 | 2.06 | 1.16$^{bc}$ | 1.10$^{bc}$ | 0.96$^{ab}$ | 0.93$^{ab}$ | 0.76$^{bc}$ | 0.70$^{bc}$ | 0.60$^{bc}$ | 0.50$^{bc}$ | 0.40$^{ab}$ |
| Flubendiamide | 0.004 | 2.06 | 1.06$^{ab}$ | 1.06$^{bc}$ | 0.90$^{ab}$ | 0.76$^{ab}$ | 0.70$^{ab}$ | 0.66$^{bc}$ | 0.50$^{ab}$ | 0.43$^{bc}$ | 0.30$^{ab}$ |
| Novaluron | 0.0075 | 2.06 | 1.33$^{c}$ | 1.23$^{bc}$ | 1.13$^{b}$ | 1.03$^{b}$ | 0.90$^{c}$ | 0.83$^{c}$ | 0.73$^{c}$ | 0.60$^{abc}$ | 0.53$^{b}$ |
| Emamectin benzoate | 0.001 | 2.06 | 0.96$^{a}$ | 0.86$^{ab}$ | 0.76$^{a}$ | 0.70$^{a}$ | 0.63$^{a}$ | 0.53$^{ab}$ | 0.43$^{a}$ | 0.26$^{ab}$ | 0.23$^{a}$ |
| Spinosad | 0.006 | 2.03 | 0.86$^{a}$ | 0.80$^{a}$ | 0.66$^{a}$ | 0.63$^{a}$ | 0.46$^{a}$ | 0.40$^{a}$ | 0.26$^{a}$ | 0.20$^{a}$ | 0.13$^{a}$ |
| Endosulfan | 0.07 | 2.03 | 1.60$^{d}$ | 1.53$^{d}$ | 1.43$^{c}$ | 1.40$^{c}$ | 1.30$^{d}$ | 1.26$^{d}$ | 1.23$^{d}$ | 1.10$^{d}$ | 0.96$^{c}$ |
| Control | | 2.06 | 2.40$^{e}$ | 2.50$^{e}$ | 2.66$^{d}$ | 2.86$^{d}$ | 3.00$^{e}$ | 3.16$^{e}$ | 3.26$^{e}$ | 3.20$^{e}$ | 2.90$^{d}$ |
| F test | | | * | * | * | * | * | * | * | * | * |
| SE ± | | NS | 0.080 | 0.096 | 0.081 | 0.078 | 0.077 | 0.060 | 0.086 | 0.068 | 0.070 |
| CD at 5% | | | 0.248 | 0.296 | 0.249 | 0.243 | 0.237 | 0.186 | 0.266 | 0.210 | 0.217 |

## Results and Discussion

Among different treatments evaluated for their efficacy, spinosad treated plots was found to be superior at 14 days after first, second and third spray, by recording 0.66, 0.40 and 0.13 larvae per plant , respectively, which was followed by emamectin benzoate which recorded 0.76, 0.53 and 0.23 larvae per plant, respectively. The treatment flubendiamide, indoxacarb, novaluron and endosulfan were recorded 0.90, 0.96, 1.13 and 1.43 larvae per plant 14 days after first spray and 0.66, 0.70, 0.83 and 1.26 larvae per plant 14 days after second spray and 0.30, 0.40, 0.53 and 0.96 larvae per plant, 14 days after third spray, respectively. The present findings were similar with these works findings.

Kanna et al. (6) reported emamectin benzoate (10.5 and 8.75 g a.i. ha) and spinosad (12.5 g a.i.ha) were effective in reducing the larval population of tomato fruit borer, *H. armigera.* Kumar and Devappa (7) reported emamectin benzoate (150 and 200 g a.i./ha) was found to be effective in suppressing larval population of diamond back moth in cabbage.

Therefore, it was concluded that among different insecticides which were screened in field for their bio-efficacy on *H. armigera* in pigeon pea, spinosad and emamectin benzoate were proved to be effective, which were followed by flubendiamide, indoxacarb and novaluron in reducing the larvel population compared to endosulfan and untreated check.

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