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# EFFICACY OF CHLORFENAPYR 24%SC AGAINST THE PIGEON PEA POD BORER *HELICOVERPA ARMIGERA* (HUBNER)

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**ABSTRACT**

**A field experiment was carried out on pigeon pea for the management of pod borer *Helicoverpa armigera* (Hubner) during kharif 2016-17 and 2017-18 at the Regional Agricultural Research Station (RARS), Vijayapura, Karnataka. The pooled data indicate that chlorfenapyr 24%SC @ 288 g ai/ ha (1200 ml/ ha) lead to 0.10 larvae/ plant and 70.72% reduction over control, which was on par with that of chlorantraniliprole 18.50SC @ 20 g ai/ ha (200 ml/ ha) with 89.35% reduction. Chlorfenapyr 24%SC @ 288 g ai/ ha (9.19% and 11.58 q/ ha) and chlorantraniliprole 18.50SC @ 20 g ai/ ha (7.34% and 12.25 q/ ha) were on par with each other in respect of pod damage and grain yield.**

**Key words:** *Helicoverpa armigera*, pigeon pea, insecticides, efficacy, chlorfenapyr, chlorantraniliprole, deltamethrin, monocrotophos, pod damage, yield

Pigeon pea *Cajanus cajan* (L) Millspaugh is one of the widely consumed pulse crops of tropical and subtropical environments and is cultivated on almost 4 million ha worldwide. In Karnataka, it is cultivated in 1.52 million ha with a production of 0.98 mt (Anon, 2019), with a low productivity. Among biotic factors, more than 200 species of insects live and feed on pigeonpea and affect its productivity. Among these, pod borers are the major pests and reduce the yield up to 27.77% (Sahoo and Senapati, 2000). Pigeon pea pod borer *Helicoverpa armigera* (Hubner) is the most destructive of these. The pyrrole insecticide, chlorfenapyr is a new compound which was initially registered in USA for the management of cockroaches, termites and ants. It is in high demand against many field pests to protect vegetable crops like cabbage, chillies and also cotton. The present study evaluates the efficacy of chlorfenapyr 24%SC against *H. armigera* in pigeonpea.

## MATERIALS AND METHODS

The present study was conducted at the Regional Agricultural Research Station (RARS), Vijayapura, Karnataka, India during kharif 2016-17 and 2017-18 on pigeonpea (TS 3R variety) with a plot size of 5.4x 3.6 m following the spacing of 90 x 30 cm. Eight treatments viz., $T_1$ (chlorfenapyr 24%SC @ 144 g ai/ ha), $T_2$ (chlorfenapyr 24%SC @ 192 g ai/ ha), $T_3$ (chlorfenapyr 24% SC @ 240 g ai/ ha), $T_4$ (chlorfenapyr 24%SC @ 288 g ai/ ha), $T_5$ (deltamethrin 2.8%SC @ 11.0 g ai/ ha), $T_6$ (monocrotophos 36%SL @ 25.0 g ai/ ha), $T_7$ (chlorantraniliprole 18.50SC @ 20 g ai/ ha), and untreated control ($T_8$) were evaluated with three replications in randomized block design. $T_7$ (chlorantraniliprole 18.50SC @ 20 g ai/ ha) was taken as standard check. First spray of insecticidal treatment was given as and when pest crosses economic threshold level of 1.0 larvae/ plant, and subsequent sprays at 15 days intervals. Observations on *H. armigera* larvae were made from five randomly selected plants/ treatment at one day before (precount) and three, five, seven and ten DAT. The data were converted into % mortality by using the formula given by Abbott (1925) and were subjected to statistical analysis.

## RESULTS AND DISCUSSION

The pooled data of two years reveal that the incidence of larva of *H. armigera* at 10 days after treatment (DAT) was significantly reduced with chlorfenapyr 24%SC @ 288 g ai/ ha (0.10 larvae/ plant- 70.72% reduction); it was on par with standard check i.e. chlorantraniliprole 18.50SC @ 20 g ai/ ha, with no incidence and 89.35% reduction. The next effective ones were chlorfenapyr 24%SC @ 240 g ai/ ha < deltamethrin 2.8%SC @ 11.0 g ai/ ha < monocrotophos 36%SL @ 25.0 g ai/ ha < chlorfenapyr 24%SC @ 192 g ai/ ha < chlorfenapyr

Table 1. Ffficacy of chlorfenapyr 24%SC against *H. armigera* in pigeon pea

| Treatment | Dosage/ ha | | Pooled data (2016-17 and 2017-18) of no. of larvae/ plant and % reduction over control | | | | | | | | | | Pod damage (%) | Yield (q/ ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | g.a.i/ha | Formulation (ml/ha) | Pre-treat | | 3 DAA | | 5 DAA | | 7 DAA | | 10 DAA | | | |
| | | | No. of larvae/ plant | % larval reduction | No. of larvae/ plant | % larval reduction | No. of larvae/ plant | % larval reduction | No. of larvae/ plant | % larval reduction | No. of larvae/ plant | % larval reduction | | |
| $T_1$: Chlorfenapyr 24%SC | 144 | 600 | 1.32 (1.35) | 2.07 (1.60) | 1.05 (1.24) | 18.62 (25.56) | 0.94 (1.20) | 31.10 (33.89) | 0.78 (1.13) | 39.91 (39.18) | 0.82 (1.15) | 41.27 (39.97) | 14.00 (21.97) | 8.85 |
| $T_2$: Chlorfenapyr 24%SC | 192 | 800 | 0.99 (1.22) | 1.74 (1.49) | 0.74 (1.11) | 19.75 (26.39) | 0.54 (1.02) | 35.89 (36.81) | 0.44 (0.97) | 45.19 (42.24) | 0.39 (0.94) | 47.84 (43.76) | 11.95 (20.22) | 10.03 |
| $T_3$: Chlorfenapyr 24%SC | 240 | 1000 | 0.60 (1.05) | 1.52 (1.42) | 0.37 (0.93) | 33.87 (35.59) | 0.28 (0.88) | 42.80 (40.86) | 0.22 (0.85) | 56.36 (48.65) | 0.19 (0.83) | 63.61 (52.90) | 10.50 (18.90) | 11.15 |
| $T_4$: Chlorfenapyr 24%SC | 288 | 1200 | 0.44 (0.97) | 1.37 (1.37) | 0.30 (0.89) | 37.98 (38.04) | 0.20 (0.84) | 52.47 (46.41) | 0.15 (0.81) | 60.19 (50.88) | 0.10 (0.77) | 70.72 (57.24) | 9.19 (17.65) | 11.58 |
| $T_5$: Deltamethrin 2.8%SC | 11.0 | 220 | 0.65 (1.07) | 1.32 (1.35) | 0.40 (0.95) | 25.18 (30.12) | 0.27 (0.88) | 40.31 (39.41) | 0.24 (0.86) | 40.31 (39.41) | 0.19 (0.83) | 54.75 (47.73) | 10.31 (18.72 | 10.75 |
| $T_6$: Monocrotophos 36%SL | 25.0 | 500 | 0.85 (1.16) | 1.74 (1.49) | 0.60 (1.05) | 30.33 (33.42) | 0.37 (0.93) | 41.23 (39.95) | 0.27 (0.87) | 53.02 (46.73) | 0.25 (0.87) | 54.98 (47.86) | 11.03 (19.39) | 10.23 |
| $T_7$: Chlorantraniliprole 18.50SC | 20 | 200 | 0.14 (0.80) | 1.17 (1.29) | 0.04 (0.73) | 46.31 (42.88) | 0.04 (0.73) | 72.15 (58.15) | 0.04 (0.73) | 86.01 (68.03) | 0.00 (0.71) | 89.35 (70.96) | 7.34 (15.71) | 12.25 |
| $T_8$: Untreated control | - | - | 3.45 (1.99) | 3.17 (1.92) | 3.54 (2.01) | 0.00 (0.00) | 3.50 (2.00) | 0.00 (0.00) | 3.44 (1.98) | 0.00 (0.00) | 3.32 (1.95) | 0.00 (0.00) | 25.59 (30.39) | 7.48 |
| CD (p=0.05) | | | 0.15 | 0.09 | 0.11 | 4.93 | 0.06 | 5.07 | 0.06 | 4.55 | 0.06 | 5.29 | 1.97 | 0.83 |
| S.Em± | | | 0.05 | 0.03 | 0.04 | 1.64 | 0.02 | 1.69 | 0.02 | 1.52 | 0.02 | 1.76 | 0.65 | 0.27 |
| CV (%) | | | 17.25 | 11.52 | 11.38 | 17.63 | 10.67 | 18.05 | 10.97 | 16.03 | 10.64 | 18.66 | 12.66 | 15.36 |

DAA: Days after application; *Values in the parentheses square root (x+ 0.5) values

24%SC @ 144 g ai/ ha (Table 1). These results are in line with those of Liu et al. (2002) with the cabbage looper *Trichoplusia ni* Hubner using chlorfenapyr. Darabian and Yarahmadi (2017) obtained significant control of reduction of sugar beet armyworm with chlorfenapyr 24%EC after 10 days of application. Ngufor et al. (2016) also observed 63% mortality of *Anopheles gambiae* from the Cove hut site in WHO resistance bioassays when treated with chlorfenafyr. Patel et al. (2016) obtained significant results with cchlorantraniliprole 18.5 SC on tomato. The pooled data revealed that chlorfenapyr 24%SC @ 288 g ai/ ha led to significantly less pod damage (9.19%) and was on par to standard check i.e. cchlorantraniliprole 18.50SC @ 20 g ai/ ha (7.34%). Khinchi and Kumawat (2020) found chlorantraniliprole 18.5SC as the most effective @ 200 ml/ ha against *H. armigera* in pigeon pea. The yield obtained in chlorfenapyr 24%SC @ 288 g ai/ ha (11.58 q/ ha) and chlorantraniliprole 18.50SC @ 20 g ai/ ha (12.25q/ ha) were statistically at par with each other but were significantly superior than rest of the treatments. Khinchi and Kumawat (2020) observed maximum yield of 17.42 q/ ha with chlorantraniliprole 18.5 SC @ 150 ml/ ha. Zhao et al. (2017) concluded that chlorfenapyr applied at 3.0, 6.0, or 12.0 kg ai/ ha had significantly decreased the number of *Bradysia odoriphaga*, major pest of Chinese chive. Thus, chlorfenapyr 24%SC @ 288 g ai/ ha and chlorantraniliprole 18.50SC @ 20 g ai/ ha can be recommended against *H. armigera* in pigeon pea.

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