



EFFICACY OF INSECTICIDES AGAINST GRAM POD BORER *HELICOVERPA ARMIGERA* ON SOYBEAN

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ABSTRACT

The effect of various insecticides on the larval incidence of pod borer *Helicoverpa armigera* in soybean revealed that indoxacarb 14.5SC (69.44%) followed by imidacloprid 17.8SL (62.65%), cypermethrin 10EC (58.06%), profenophos 50EC (54.05%), quinalphos 25EC (48.83%) and neem oil (40.59%) led to maximum reduction. Their effect on the yield of soybean revealed that the maximum yield was with indoxacarb 14.5EC (19.19) followed by others.

Key words: Soybean, *Helicoverpa armigera*, indoxacarb, incidence, larva, imidacloprid, cypermethrin, profenophos, quinalphos, neem oil, yield

Soybean *Glycine max* (L.) is cultivated in 120.50 million ha with a productivity of 2785 kg/ ha (Anonymous, 2020a). In India, its productivity is 1005 kg/ ha (Anonymous, 2020b). Like other crops, soybean is also attacked by numerous pests. *Helicoverpa armigera* (Hubner) causes serious damage in the vegetative stage of crop as they mostly target axillary buds of the plants which give rise to the floral buds. This pest damage results in leaf chewing, terminal damage and damage to pods. Vegetative soybeans are more prone to *H. armigera* than that of other pulses. The present study evaluates the efficacy of some insecticides on the incidence of *H. armigera* in soybean.

MATERIALS AND METHODS

The field experiment was carried out in the experimental field of Division of Entomology, Faculty of Agriculture, Wadura, during kharif 2020. Soybean crop was grown adopting recommended SKUAST-Kashmir package of practices. The experiment was laid out in randomized block design (RBD) with three replications in plots of size 2 m² each. The crop was sown in the 3rd week of May, 2020 with row to row and plant to plant spacing of 45x 5 cm. There were seven treatments along with an untreated check. The insecticides viz., cypermethrin 10EC (0.006%), indoxacarb 14.5EC (0.007%), profenophos 50EC (0.05%), neem oil (0.3%), imidacloprid 17.8SL

(0.005%), quinalphos 25EC (0.025%) along with control (water spray) were evaluated as foliar sprays with knapsack sprayer with spray fluid of 500 l/ ha. Pretreatment observations on larval incidence was recorded a day before spraying, while post treatment observations were taken after 1st, 3rd, 7th, 10th day after treatment (DAT) from 5 randomly selected and tagged plants. The % reduction of incidence over pretreatment was worked out following Abbot's (1925) formula: The data obtained on % reduction were analyzed statistically using ANOVA (p=0.05)

RESULTS AND DISCUSSION

The incidence of *H. armigera* ranged from 30.16-85.05%, 37.90-95.83%, 28.24-80.09%, 21.75-55.71%, 27.38-91.07% and 26.19-63.49% after treatment of chemical pesticides, viz., cypermethrin 10EC (0.006%), indoxacarb 14.5EC (0.007%), profenophos 50EC (0.05%), neem oil (0.3%), imidacloprid 17.8 SL (0.005%) and quinalphos 25 EC (0.025) in comparison to control (4.17-13.09%), respectively (Table 1). The mean % reduction was found to be maximum with indoxacarb 14.5EC 0.007% as 37.90, 57.94, 86.11 and 95.83% at 0.5 ml/ l. With pooled data cypermethrin 10EC (0.006%), indoxacarb 14.5EC (0.007%), profenophos 50EC (0.05%), neem oil (0.3%), imidacloprid 17.8 SL (0.005%) and quinalphos 25 EC (0.025) revealed reduction of 58.06, 69.44, 54.05, 40.59, 62.65 and 48.83%, respectively. Yogeshwardu

Table 1. Efficacy of insecticides against pod borer *H. armigera* in soybean

Treatment	Concentration (%)	Dosage (ml/ l)	Pretreatment count (1 DBT)	Reduction of larvae over pre-treatment (%)				Cumulative mean (%)
				1 st	3 rd	7 th	10 th	
Cypermethrin 10EC	0.006	0.6	6.67 (2.58)	30.16 (33.29)	50.00 (45.00)	69.84 (57.21)	85.05 (71.28)	58.06 (51.69)
Indoxacarb 14.5EC	0.05	0.5	7.00 (2.64)	37.90 (37.97)	57.94 (49.61)	86.11 (71.97)	95.83 (83.09)	69.44 (60.67)
Profenophos 50EC	0.05	1.0	8.33 (2.88)	28.24 (31.96)	48.16 (43.94)	68.06 (55.66)	80.09 (63.72)	54.05 (48.82)
Neem oil	0.3	3.0	6.00 (2.44)	21.75 (27.66)	33.97 (35.60)	50.95 (45.55)	55.71 (48.29)	40.59 (39.27)
Imidacloprid 17.8SL	0.005	0.5	7.33 (2.71)	27.38 (31.54)	54.76 (47.74)	77.38 (61.82)	91.07 (75.69)	62.65 (54.20)
Quinolfos 25EC	0.025	1.0	6.33 (2.51)	26.19 (30.56)	47.62 (43.63)	57.94 (49.61)	63.49 (52.86)	48.83 (44.16)
Water			7.67 (2.77)	13.09 (21.20)	12.50 (16.90)	08.33 (13.80)	04.17 (6.90)	9.52 (14.70)
C.D. ($P \leq 0.05$)			1.21 (0.23)	9.94 (6.64)	9.58 (10.34)	15.50 (14.83)	12.59 (15.07)	

*Mean of three replications; Figures in parentheses are sine transformed values; DAT = Days after treatment; DBT: Days before treatment

et al. (2014) observed that indoxacarb 14.5 SC (1 ml/l) was the most effective against *H. armigera*. Singh et al. (2012) also observed similar results. Kumar et al. (2013) evaluated the efficacy of some insecticides against *H. armigera* in soybean, and observed that spinosad 0.025%, thiodicarb 0.15%, and indoxacarb 0.0029% were the most effective against *S. litura* and rynaxypyr 0.006% against *H. armigera*. All the treatments significantly increased the yield of soybean with indoxacarb 14.5EC giving maximum (17.08 q ha⁻¹) followed by imidacloprid 17.8 SL and others, thus giving 6.98 to 19.19% increase in yield over control. Gowda et al. (2006) observed that spinosad 35SC and indoxacarb 14.5SC are the most effective in increasing grain yield. Singh et al. (2012) found indoxacarb treated plots giving maximum grain yield.

AUTHOR CONTRIBUTION STATEMENT

All authors equally contributed.

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CONFLICT OF INTEREST

No conflict of interest.

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