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EVALUATION OF INSECTICIDES AGAINST GALL WEEVIL *ALCIDODES COLLARIS* (PASCOE) ON PIGEONPEA

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ABSTRACT

Pigeonpea is attacked by many insect pests, and of these the gall weevil *Alcidodes collaris* (Pascoe) causes threat to pigeonpea at seedling stage by attacking basal portion of the stem and resulting in the gall formation. Evaluation of some insecticides revealed that less incidence was observed using seed treatment with imidacloprid 600FS followed by chlorantraniliprole 18.5SC spray (1.17 galled plants/ 10 plants) after 20 days of emergence. This also resulted in maximum reduction of galled plants (79.37%). Imidacloprid 600FS seed treatment with drenching of profenophos 50EC at 20 days after the crop emergence was observed to be the next best. Seeds treatment with imidacloprid 600FS followed by chlorantraniliprole 18.5SC spray gave maximum yield of 23.38 q/ ha.

Key words: Pigeonpea, *Alcidodes collaris*, seed treatment, imidacloprid 600FS, chlorantraniliprole 18.5SC, profenophos 50EC, galled plants, yield

Pigeonpea *Cajanus cajan* is a tropical and subtropical legume known as red gram or tur and cultivated for its edible seeds. This crop is damaged by a wide range of insect pests both in the field and storage. Almost all parts of plant are damaged (Upadhyay et al., 1998), and in transitional belt of Karnataka mainly in Dharwad the gall weevil *Alcidodes collaris* (Pascoe) is one of the regular and major pest. This causes 25-30% loss in yield. *Alcidodes collaris* belongs to the subfamily Alcidinae of family Curculionidae and order Coleoptera. Damage is initiated by the female adult by scraping the basal region of seedlings for oviposition. After hatching grubs feed on living tissues inside the stem, and this leads to gall formation at the collar region (Parchabhavi et al., 1972). Due to the gall formation dislodging and drying of seedlings occurs (Rachappa and Lingappa, 2006). In the later stages, adult nibbles the tender shoots which lead to drooping of young tips (Hugar, 2001). Since the pest attacks basal portion of stem and inhabits the soil, its damage goes unnoticed. More importantly, this pest is known to damage early stage of the crop without any visual symptoms which leads to difficulties at farmer's level. There are very few studies on managing the pest, and hence, the present study evaluates management with some insecticides.

MATERIALS AND METHODS

A field experiment was conducted at the Main Agricultural Research Station, Dharwad in pigeonpea in randomized block design with 11 treatments with 3 replications, along with untreated check. Wilt resistant variety TS-3R with the spacing 90x 30 cm was used with plot size of 15 m^2. Sowing was done during 1st week of July, and recommended package of practices were followed except plant protection in the early stage and in the later stage chemical spray was made against *Helicoverpa armigera*. The observations on the total number of plants and the gall formed plants were recorded at 25 and 50 days after emergence, with the plant stand at harvest observed with % reduction in plant stand. Yield was observed and cost economics data were worked out. The data were subjected to statistical analysis to evaluate the statistical significance of treatments.

RESULTS AND DISCUSSION

The results revealed that the least incidence of *A collaris* was observed when seeds were treated with imidacloprid 600FS followed by spray of chlorantraniliprole 18.5SC (T_9) at 20 days after emergence. Maximum reduction in galled plants was also observed with this treatment followed by imidacloprid 600FS seed treatment+ profenophos 50EC (T_3) drenching at 20 days after emergence. Imidacloprid 600FS seed treatment+ chlorpyriphos 20EC drenching was also found effective; and least efficacy was observed with thiamethoxam 35FS seed treatment + fipronil 5SC spray (Table 1). These results corroborate

Table 1. Efficacy of insecticides against *A. collaris* in pigeonpea

S. No.	Treatment	No. of galled plants			% reduction over control	Yield (q/ ha)	Cost of treatment (`/ ha)	Total cost (`/ ha)	Gross return (`/ ha)	Net return (`/ ha)
		25 DAE*	50 DAE*	Mean						
T_1	Imidachloprid 600FS seed treatment 10 ml/ kg of seeds	1.67 (1.46)^{ab}	2.67 (1.77)^{bc}	2.17 (1.63)^{bc}	61.72	18.56 (4.34)^{b}	537.50	37441.50	103936.00	66494.50
T_2	Thiamethoxam 35FS seed treatment 10 ml/ kg of seeds	2.33 (1.68)^{c}	2.67 (1.77)^{bc}	2.50 (1.73)^{c}	55.91	17.96 (4.28)^{b}	81.25	36985.25	100576.00	63590.75
T_3	T_1 + Profenophos 50EC drenching 2 ml/ l at 20 DAE	1.00 (1.22)^{ab}	2.00 (1.56)^{b}	1.50 (1.41)^{b}	73.54	22.24 (4.76)^{ab}	674.30	37578.30	124544.00	86965.70
T_4	T_2 + Profenophos 50EC drenching 2 ml/ l at 20 DAE	1.33 (1.34)^{abc}	3.00 (1.86)^{bc}	2.16 (1.63)^{bc}	61.90	20.53 (4.55)^{abc}	218.05	37122.05	114968.00	77845.50
T_5	T_1 + Fipronil 5SC spray 1 ml/ l at 20 DAE	1.67 (1.46)^{bc}	3.33 (1.94)^{bc}	2.50 (1.73)^{c}	55.91	16.33 (4.08)^{bc}	817.50	37721.50	91448.00	53726.50
T_6	T_2 + Fipronil 5 SC spray 1 ml/ l at 20 DAE	2.00 (1.58)^{c}	3.33 (1.93)^{bc}	2.67 (1.78)^{c}	52.91	15.67 (3.99)^{bc}	361.25	37265.25	87752.00	50486.75
T_7	T1 + Chlorpyriphos 20EC drenching 1.5 ml/ l at 20 DAE	0.67 (1.05)^{a}	2.33 (1.68)^{b}	1.50 (1.41)^{b}	73.54	20.78 (4.59)^{abc}	633.50	37537.50	116368.00	78830.50
T_8	T_2 + Chlorpyriphos 20EC drenching 1.5 ml/ l at 20 DAE	1.33 (1.34)^{abc}	3.33 (1.95)^{bc}	2.33 (1.68)^{bc}	58.91	19.89 (4.49)^{abc}	177.25	37081.25	111384.00	74302.75
T_9	T_1 +Chlorantraniliprole 18.5SC spray 0.2 ml/ llat 20 DAE	0.67 (1.05)^{a}	1.67 (1.46)^{a}	1.17 (1.29)^{a}	79.37	23.38 (4.88)^{a}	1113.50	38017.50	130928.00	92910.50
T_{10}	T_2 + Chlorantraniliprole 18.5SC spray 0.2 ml/lit at 20 DAE	1.67 (1.46)^{bc}	2.33 (1.68)^{b}	2.00 (1.58)^{bc}	64.72	21.02 (4.61)^{abc}	657.25	37561.25	117712.00	80150.75
T_{11}	Untreated check	5.00 (2.34)^{d}	6.33 (2.61)^{d}	5.67 (2.48)^{d}	–	12.89 (3.63)^{c}		36904.00	72184.00	35280.00
	SEm±	0.11	0.14			0.32				
	CD (p=0.05)	0.33	0.40			0.95				
	CV (%)	13.46	12.74			12.77				

*Mean of three replications. Other expenditure = Rs. 36,904; Cost of pigeonpea (Rs./q) = 5600; Cost of chemicals**:** Imidacloprid 600FS = Rs. 430/100 ml; Thiamethaxam 35FS = Rs. 650/ l; Profenophos 50EC = Rs. 600/ l; Chloropyriphos 20EC = Rs. 100/ 250 ml; Fipronil 5SC = Rs. 175/ 100 ml; Chlorantraniliprole 18.5SC = Rs. 180/ 10 ml; Values in parentheses square root transformation; DAE- Days after emergence

with those of Hugar (2001) and Shivaji and Basavana Goud (2003) that chlorpyriphos drenching was superior. As regards yield, pigeon pea seeds treated with imidacloprid 600FS followed by chlorantraniliprole 18.5SC (T_9) spray gave maximum yield of 23.38 q/ha, with highest net return. Imidacloprid 600FS seed treatment + drenching with profenophos 50EC and imidacloprid seed treatment 600FS + drenching with chlorpyriphos 20EC were the next best, while thiamethoxam 35 FS (seed treatment) + fipronil 5SC spray gave the least yield of 15.67 q/ ha (Table 1). Hugar (2001) also reported that drenching with chlorpyriphos gave maximum yield and incremental benefit cost ratio. Shivaji and Basavana Goud (2003) obtained maximum yield with chlorpyriphos drenching. Thus, imidacloprid 600FS seed treatment followed by chlorantraniliprole 18.5SC spray can be recommended for managing gall weevil incidence.

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AUTHOR CONTRIBUTION STATEMENT

All authors equally contributed.

CONFLICT OF INTEREST

No conflict of interest.

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