Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2019; 7(4): 456-460

Received: 14-05-2019
Accepted: 16-06-2019

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Management of *Exelastis atomosa* (Walsingham) based on spray schedule at different growth stages of pigeon pea

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Abstract
Study revealed during *Kharif*-2017-18 and 2018-19 pooled on variety basis, the BDN-711 noted (0.31, 0.34, 0.40 and 0.75 larva/plant), (0.25, 0.30, 0.47 and 0.81) and (0.28, 0.32, 0.43 and 0.78 larva/plant) and least larval count found when crop was sprayed at 50% flowering stage crop growth stage basis (0.75, 0.85, 1.15 and 2.06 larva/plant), (0.58, 0.79, 1.36 and 2.26 larva/plant) and (0.66, 0.82, 1.26 and 2.16 larva/plant) at 1st, 3rd, 7th and 14th DAS, respectively after 1st, 2nd spray and pooled on four different varieties of pigeon pea *viz.*, BDN-711 (early), BSMR-736 (late), BSMR-853 (late) and BSMR-716 (mid-late) were observed under field condition in split plot design with two sprays of emamectin benzoate 5% SG @ 4.4 gm followed by flubendiamide 39.3% SC @ 3.9 ml/10 lit of water at 15 days interval were taken at various crop growth stages.

Keywords: *E. atomosa*, different cultivars, pigeon pea, emamectin benzoate, flubendiamide

1. Introduction
On pigeon pea (*Cajanas cajan* (L) Millsp.) about 250 species of insect pests belongs to 8 orders and 61 families had reported by several researchers (Davies and Lateef, 1977) [1]. Imperative pests infesting pigeon pea crops are pod borer, *Helicoverpa armiger*a (Hubner), plume moth, *Exelastis atomosa* (Walsingham), pod fly, *Melanogromyza obtusa (*Malloch), spotted pod borer, *Maruca vitrata* (Fabricius), Among the constituents of the pod borer community infesting pigeon pea, the plume moth, *Exelastis atomosa* Walshigham (Lepidoptera: Pterophpridae) posses serious menace to its cultivation, larva bore into unopened flower buds for consuming the developing anthers and more damage is seen during flowering, pod maturing and pod filling stage and reported that on an average, the pod damage in pigeon pea to plume moth was 8.9% and grain damage was 4.0%. Further, a common recommendation regarding stage of crop and pest management cannot satisfy the demand of optimum yield. Hence an attempt was made to find out the most effective time of spraying in respect to crop stage that can provide satisfactory pest control.

2. Materials and site of experiment
The field experiment was conducted during *Kharif* 2017-18 and *Kharif* 2018-19 at the Experimental Farm of Department of agricultural Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (MH) in split plot design with three replications on four different varieties of pigeon pea as BDN- 711, BSMR- 736, and BSMR-853 BSMR-716 with a spacing of 120 cm x 30 cm.

2.1 Experimental Detail:

1.	Year and Season	:	*Kharif*-2017-18, and *Kharif* -2018-19.
2.	Name of crop	:	Pigeon pea
3.	Varieties	:	BDN-711 (Early), BSMR-736 (Late), BSMR-853 (Late) and BSMR-716 (Mid-late).
4.	Design	:	Split plot Design
5.	Spacing	:	120 cm × 30 cm
6.	Net plot size	:	4.8 m × 4.2 m
7.	No. of treatments	:	06
8.	Replication	:	03

9. Number of plots : 72
10. Date of sowing : 16/06/2017 (1st year) and 20/06/2018 (2nd year)

Treatment details

Spray No.	Name of Insecticides	Concentration (%)	Dose /10 litre of water
1st	Emamectin benzoate 5% SG	0.0022	4.4 g
2nd	Flubendiamide 39.3% SC	0.0078	3.9 ml

A) Main Plot Treatment: Variety
V1- BDN-711 (Early), V2 - BSMR-736 (Late) V3 -BSMR - 853 (Late) and V4 - BSMR-716 (Mid late),

B) Sub Plot Treatments: (Crop growth stages)
T_1 : 1st spraying at bud initiation stage followed by 2nd spraying after 15 days
T_2 : 1st spraying at 50% bud formation stage followed by 2nd spraying after 15 days
T_3 : 1st spraying at flower initiation stage followed by 2nd spraying after 15 days
T_4 : 1st spraying at 10% flowering stage followed by 2nd spraying after 15 days
T_5 : 1st spraying at 50% flowering stage followed by 2nd spraying after 15 days
T_6 : 1st spraying at pod formation stage followed by 2nd spraying after 15 days

Method of recording observations of larval population of *E. atomosa*
The observations on larval population were noted on randomly selected five plants from each treatment 1 day before and 1, 3, 7 and 14 days after each application of insecticides. The data obtained in insect numbers were subjected to poison formula $\sqrt{X+0.5}$ before further analysis. The analysis of pooled data was carried out to ascertain effect of different spraying dates on management of pod borer complex of pigeon pea and their effect on natural enemies of pod borer complex. Appropriate statistical methods were employed to work out standard error (SE) and critical difference (CD) to know the significance of treatments (Gomez and Gomez, 1984) [2].

3. Findings

3.1 Effect of different spray schedule against *E. atomosa*
Data pertaining to the effect of spray schedule on management of *E. atomosa* are presented in Table 1.

3.1.1 Performance of different varieties
The observation regarding performance of varieties against infestation of *E. atomosa* revealed that, least larval population 0.28, 0.32, 0.43 and 0.78 larva/plant at 1st, 3rd, 7th and 14th DAS on variety V_1-BDN-711, respectively. At first DAS larval population observed on variety V_1-BDN-711 found at par with the population recorded on variety V_3-BSMR-853 (0.36 larva/plant) and V_4-BSMR-716 (0.37 larva/plant). At 3rd, 7th and 14th DAS the population of *E. atomosa* on variety V_1-BDN-711 observed at par with the population noted on the rest of all varieties.

3.1.2 Effect of spray schedules
There was no larval population of *E. atomosa* observed at all the frequencies of recording the observations up to 50% flowering stage (T_5). At one day after 1st spray the minimum incidence was observed when crop was sprayed at treatment T_5-50% flowering stage 0.66 larvae/plant whereas maximum at pod formation stage 1.49 larvae/plant. At 3rd, 7th and 14th 1.26 and 2.16 whereas maximum incidence were recorded when then the crop was sprayed at pod formation stage *i.e.* 1.67, 2.05, and 2.72, respectively.

3.1.3 Interaction effect
The interaction effect of variety and spray schedules on incidence of *E. atomosa* after first and second spray over all pooled data (Table 2, 3, 4 and 5) showed minimum larval count observed at 50% flowering stage at first day 0.57, 0.88, 0.62 and 0.55 at third day 0.64, 1.01, 0.85 and 0.79 at seventh day 1.01, 1.30, 0.37 and 1.35 at fourteenth day 1.87, 2.37, 2.20 and 2.21larvae/plant. Whereas the maximum incidence was at first day 1.12, 1.63, 1.53 and 1.68 at third day 1.28, 1.77, 1.77 and 1.89 at seventh day 1.58, 2.13, 2.16 and 2.32 at fourteenth day 2.52, 2.69, 2.67 and 3.02 larva/plant (Table 51, 52, 53 and 54) recorded at treatment T_6-pod formation stage among all test varieties V_1-BDN-711, V_2-BSMR-736, V_3-BSMR-853 and V_4-BSMR-716, respectively.

3.2 Per cent reduction of larval population of *E. atomosa*
Data pertaining to per cent reduction of larval population of *E. atomosa* after first and second spray and over all pooled during both the year are presented in Table 1.

3.2.1 Varietal performance against per cent reduction of larval population of *E. atomosa*
The least per cent of larval reduction were found in V_2-BSMR-736 (62.07, 57.98, 48.11 and 23.39 per cent reduction over control) and maximum in V_1-BDN-711 (74.29, 70.87, 60.53 and 28.68 per cent reduction over control) at first, second, third and fourth days after spraying, respectively.

3.2.2 Effect of spray schedule on per cent reduction of larval population of *E. atomosa*
The data from Table 1 revealed that per cent reduction in larval population of *E. atomosa* recorded at different days after first and second spray pooled showed significant differences among various crop growth stages. The least per cent of larval reduction were found in treatment T_6-pod formation stage (58.05, 52.80, 42.31 and 23.25 per cent reduction over control) and maximum in treatment T_5- 50% flowering stage (79.08, 73.81, 59.84 and 31.01 per cent reduction over control) at first, second, third and fourth days after spraying, respectively.
The reviews regarding effect of spraying dates applied at various crop growth stages and there interaction are quite amalgamate since this is a new affect to study in entomological research. The work done and reviews reported by earlier worker regarding parallel issues are being presented here. Wadaskar *et al*., (2012) [8] revealed spraying of azadirachtin 10000 ppm @ 10 ml /10 L of water at 50 per cent flowering stage of crop followed by second spraying of emamectin benzoate 5 SG @ 3 g / 10 L of water at 15 day after first spraying and third spraying of deltamethrin 1 EC +

triazophos 35 EC ready mix formulation @ 25 ml /10 L of water at 15 days, after second spraying, which registered highest larval reduction of lepidopteran pod borers.

Priyadarshini (2013) [5] concluded flubendiamide 480 SC at 60 g a.i. ha^{-1} was found to be the most effective with a maximum reduction in lepidopteran pod borers with pod damage, grain damage and weight loss of 5.3, 3.3 and 2.9 per cent, respectively. When two sprayings were taken up *i.e.*, first spray at 50 per cent flowering while second spray during pod formation stage. Karmakar and Patra (2015) [3] revealed that pyridalyl 15% + fenpropathrin 20% EC @ 105+140 g a.i. / ha and 90+120 g a.i./ ha were quite effective and were at par with each other in *E. atomosa* when first spray was given at 10% flowering followed by full blooming and bearing stage at 25 days interval.

Shinde *et al*., (2017) [7] revealed that the no. of larvae/plant of *E. atomosa* before 1st spray the larval count was 0.50 to 0.51 and before 2nd spray 2.57 to 2.62. However the minimum *E. atomosa* population was observed in variety V_1 (BDN-711) followed by V_2 (BSMR716) and V_3 (BSMR-736) after Ist and IInd spray. Raut *et al.* 2016 reported that the application of insecticides at bud initiation stage followed by 50% flowering stage 15 days after 50% flowering were proved better, recording minimum 3.74 and 3.73 percent damage by lepidopteran pest on green pod. Similar results were also reported by The work done by Patange and Chiranjeevi (2017) [4] noted the application of rynaxypyr 18.5 SP @ 30 g a.i./ha was best treatment and recorded minimum larval population of *E. atomosa* on one, three, seven and fifteen day after spray i.e. 0.13, 0.13, 0.07 and 0.07 larvae per plant, respectively.

Table 1: Effect of different varieties of pigeon pea and spray schedules against *E. atomosa* after 1st and 2nd spray (over all pooled 2017-18 & 2018-19)

Treatment	Pre count	No. of *E. atomosa* larvae/plant															
		1st spray				2nd spray				Over all pooled				% Reduction			
		1 DAS	3 DAS	7 DAS	14 DAS	1 DAS	3 DAS	7 DAS	14 DAS	1 DAS	3 DAS	7 DAS	14 DAS	1 DAS	3 DAS	7 DAS	14 DAS
A. Main treatment: Variety																	
V_1-BDN-711	1.10	0.31	0.34	0.40	0.75	0.25	0.30	0.47	0.81	0.28	0.32	0.43	0.78	74.29	70.87	60.53	28.68
	1.26	0.90	0.91	0.95	1.12	0.87	0.90	0.98	1.14	0.88	0.90	0.96	1.13				
V_2- BSMR-736	1.10	0.46	0.49	0.53	0.79	0.38	0.44	0.61	0.89	0.42	0.46	0.57	0.84	62.07	57.98	48.11	23.39
	1.27	0.98	0.99	1.02	1.14	0.94	0.97	1.05	1.18	0.96	0.98	1.03	1.16				
V_3- BSMR-853	1.10	0.41	0.44	0.54	0.86	0.31	0.44	0.64	0.85	0.36	0.44	0.59	0.85	67.44	60.39	46.67	22.60
	1.27	0.95	0.97	1.02	1.17	0.90	0.97	1.07	1.16	0.93	0.97	1.04	1.16				
V_4- BSMR-716	1.16	0.37	0.45	0.60	0.84	0.38	0.44	0.63	0.90	0.37	0.45	0.61	0.87	67.88	61.48	47.06	24.69
	1.29	0.93	0.97	1.05	1.16	0.94	0.97	1.06	1.18	0.93	0.97	1.05	1.17				
S.E. ±	0.06	0.02	0.03	0.03	0.04	0.02	0.03	0.04	0.05	0.02	0.03	0.03	0.05				
CD at 5%	NS	0.07	0.08	0.10	0.13	0.07	0.08	0.11	0.14	0.07	0.08	0.10	0.13				
B. Sub treatment: Spray schedule																	
T_1- Bud initiation stage	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
	0.71	0.71	0.71	0.71	0.80	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.75				
T_2- 50% bud formation stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71				
T_3- Flower initiation stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00
	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.79	0.71	0.71	0.71	0.75				
T_4- 10% flowering stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71				
T_5- 50% flowering stage	3.13	0.74	0.85	1.15	2.06	0.58	0.79	1.36	2.26	0.66	0.82	1.26	2.16	79.08	73.81	59.84	31.01
	1.91	1.11	1.16	1.28	1.60	1.04	1.13	1.36	1.66	1.07	1.15	1.32	1.63				
T_6- Pod formation stage	3.55	1.58	1.71	1.95	2.66	1.39	1.64	2.15	2.79	1.49	1.67	2.05	2.72	58.05	52.80	42.31	23.25
	2.01	1.44	1.49	1.56	1.78	1.38	1.46	1.62	1.81	1.41	1.47	1.59	1.80				
S.E. ±	0.08	0.03	0.03	0.04	0.05	0.03	0.03	0.04	0.06	0.03	0.03	0.04	0.06				
CD at 5%	NS	0.09	0.10	0.12	0.16	0.09	0.10	0.13	0.17	0.09	0.10	0.12	0.16				
C. Interaction(V XT)																	
S.E. ±	0.15	0.06	0.07	0.08	0.11	0.06	0.07	0.09	0.11	0.06	0.07	0.08	0.11				
CD at 5%	NS	0.18	0.20	0.24	NS	0.17	0.20	0.26	NS	0.17	0.20	0.25	NS				
GM	1.11	0.39	0.43	0.52	0.79	0.33	0.40	0.59	0.86	0.36	0.42	0.55	0.82				

*Figures in parentheses are $\sqrt{X + 0.5}$ transformed values, NS: Non Significant and DAS: Days after spray

Table 2: Interaction effect of varieties of pigeon pea and spray schedules on incidence of *E. atomosa* 1st day after 1st and 2nd spray (over all pooled 2017-18 & 2018-19)

No. of *E. atomosa* larvae/plant																		
V X T	**1st spray**						**2nd spray**						**Pooled**					
	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**
V1-BDN-711	0.00	0.00	0.00	0.00	0.63	1.24	0.00	0.00	0.00	0.00	0.51	1.00	0.00	0.00	0.00	0.00	0.57	1.12
	(0.71)*	0.71	0.82	0.71	1.06	1.32	0.71	0.71	0.71	0.71	1.00	1.22	0.71	0.71	0.71	0.71	1.03	1.27
V2-BSMR-736	0.00	0.00	0.00	0.00	0.98	1.76	0.00	0.00	0.00	0.00	0.78	1.50	0.00	0.00	0.00	0.00	0.88	1.63
	0.71	0.71	0.71	0.71	1.22	1.50	0.71	0.71	0.71	0.71	1.13	1.41	0.71	0.71	0.71	0.71	1.17	1.46
V3-BSMR-853	0.00	0.00	0.00	0.00	0.77	1.70	0.00	0.00	0.00	0.00	0.48	1.36	0.00	0.00	0.00	0.00	0.62	1.53
	0.71	0.71	0.71	0.71	1.12	1.48	0.71	0.71	0.71	0.71	0.99	1.36	0.71	0.71	0.71	0.71	1.05	1.42
V4-BSMR-716	0.00	0.00	0.00	0.00	0.57	1.63	0.00	0.00	0.00	0.00	0.54	1.72	0.00	0.00	0.00	0.00	0.55	1.68
	0.71	0.71	0.71	0.71	0.88	1.46	0.71	0.71	0.71	0.71	1.02	1.49	0.71	0.71	0.71	0.71	1.03	1.47
S.E. ±	0.06						0.06						0.06					
C.D.at 5%	0.18						0.17						0.17					

Table 3: Interaction effect of varieties of pigeon pea and spray schedules on incidence of *E. atomosa* 3rd day after 1st and 2nd spray (over all pooled 2017-18 & 2018-19)

No. of *E. atomosa* larvae/plant																		
V X T	**1st spray**						**2nd spray**						**Pooled**					
	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**
V1-BDN-711	0.00	0.00	0.00	0.00	0.71	1.31	0.00	0.00	0.00	0.00	0.56	1.25	0.00	0.00	0.00	0.00	0.64	1.28
	(0.71)*	0.71	0.71	0.71	1.10	1.34	0.71	0.71	0.71	0.71	1.03	1.32	0.71	0.71	0.71	0.71	1.06	1.33
V2-BSMR-736	0.00	0.00	0.00	0.00	1.06	1.85	0.00	0.00	0.00	0.00	0.96	1.68	0.00	0.00	0.00	0.00	1.01	1.77
	0.71	0.71	0.71	0.71	1.25	1.53	0.71	0.71	0.71	0.71	1.21	1.48	0.71	0.71	0.71	0.71	1.23	1.51
V3-BSMR-853	0.00	0.00	0.00	0.00	0.87	1.76	0.00	0.00	0.00	0.00	0.84	1.78	0.00	0.00	0.00	0.00	0.85	1.77
	0.71	0.71	0.71	0.71	1.16	1.50	0.71	0.71	0.71	0.71	1.15	1.51	0.71	0.71	0.71	0.71	1.16	1.51
V4-BSMR-716	0.00	0.00	0.00	0.00	0.78	1.92	0.00	0.00	0.00	0.00	0.80	1.85	0.00	0.00	0.00	0.00	0.79	1.89
	0.71	0.71	0.71	0.71	1.13	1.56	0.71	0.71	0.71	0.71	1.14	1.53	0.71	0.71	0.71	0.71	1.13	1.55
S.E. ±	0.07						0.07						0.07					
C.D.at 5%	0.20						0.20						0.20					

Table 4: Interaction effect of varieties of pigeon pea and spray schedules on incidence of *E. atomosa* 14th day after 1st and 2nd spray (over all pooled 2017-18 & 2018-19)

No. of *E. atomosa* larvae/plant																		
V X T	**1st spray**						**2nd spray**						**Pooled**					
	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**
V1-BDN-711	0.00	0.00	0.00	0.00	0.85	1.54	0.00	0.00	0.00	0.00	1.18	1.63	0.00	0.00	0.00	0.00	1.01	1.58
	(0.71)*	0.71	0.71	0.71	1.16	1.43	0.71	0.71	0.71	0.71	1.28	1.45	0.71	0.71	0.71	0.71	1.22	1.44
V2-BSMR-736	0.00	0.00	0.00	0.00	1.21	2.00	0.00	0.00	0.00	0.00	1.40	2.26	0.00	0.00	0.00	0.00	1.30	2.13
	0.71	0.71	0.71	0.71	1.30	1.58	0.71	0.71	0.71	0.71	1.37	1.66	0.71	0.71	0.71	0.71	1.34	1.62
V3-BSMR-853	0.00	0.00	0.00	0.00	1.26	1.96	0.00	0.00	0.00	0.00	1.48	2.35	0.00	0.00	0.00	0.00	1.37	2.16
	0.71	0.71	0.71	0.71	1.31	1.57	0.71	0.71	0.71	0.71	1.40	1.69	0.71	0.71	0.71	0.71	1.37	1.63
V4-BSMR-716	0.00	0.00	0.00	0.00	1.30	2.30	0.00	0.00	0.00	0.00	1.41	2.35	0.00	0.00	0.00	0.00	1.35	2.32
	0.71	0.71	0.71	0.71	1.34	1.67	0.71	0.71	0.71	0.71	1.38	1.68	0.71	0.71	0.71	0.71	1.36	1.68
S.E. ±	0.08						0.09						0.08					
C.D.at 5%	0.24						0.26						0.25					

Table 5: Interaction effect of varieties of pigeon pea and spray schedules on incidence of *E. atomosa* 7th day after 1st and 2nd spray (over all pooled 2017-18 & 2018-19)

No. of *E. atomosa* larvae/plant																		
V X T	**1st spray**						**2nd spray**						**Pooled**					
	T_1	**T_2**	**T_3**	**T_4**	**T_5**	**T_6**	**T_1**	**T_2**	**T_3**	**T_4**	**T_5**	**T_6**	**T_1**	**T_2**	**T_3**	**T_4**	**T_5**	**T_6**
V_1-BDN-711	0.60	0.00	0.00	0.00	1.70	2.20	0.00	0.00	0.00	0.00	2.04	2.83	0.30	0.00	0.00	0.00	1.87	2.52
	(0.71)*	0.71	0.71	0.71	1.48	1.64	0.71	0.71	0.71	0.71	1.59	1.82	0.88	0.71	0.71	0.71	1.54	1.73
V_2-BSMR-736	0.00	0.00	0.00	0.00	2.17	2.59	0.00	0.00	0.00	0.00	2.57	2.80	0.00	0.00	0.00	0.00	2.37	2.69
	0.71	0.71	0.71	0.71	1.63	1.76	0.71	0.71	0.71	0.71	1.75	1.82	0.71	0.71	0.71	0.71	1.69	1.79
V_3-BSMR-853	0.00	0.00	0.00	0.00	2.39	2.76	0.00	0.00	0.50	0.00	2.02	2.57	0.00	0.00	0.25	0.00	2.20	2.67
	0.71	0.71	0.71	0.71	1.70	1.81	0.71	0.71	0.97	0.71	1.58	1.75	0.71	0.71	0.85	0.71	1.64	1.78
V_4-BSMR-716	0.00	0.00	0.00	0.00	1.99	3.07	0.00	0.00	0.00	0.00	2.43	2.96	0.00	0.00	0.00	0.00	2.21	3.02
	0.71	0.71	0.71	0.71	1.58	1.89	0.71	0.71	0.71	0.71	1.71	1.86	0.71	0.71	0.71	0.71	1.65	1.87
S.E. ±	0.11						0.11						0.11					
C.D.at 5%	0.32						0.34						0.33					

4. Conclusion

In all the varieties *viz.*, BDN-711, BSMR-736, BSMR-853 and BSMR-716 infestation of *E. atomosa* was not found till 10 % flowering crop stage and minimum count was observed when crop was sprayed at 50% flowering stage. The precise conclusion from above study can be made in such a way that varieties having different duration have to be protected at its different growth stages. Now a day's most of the farmers are following the spray schedule of 1st spray at 50% flowering stage followed by second spray at 15 days interval, to manage pod borer complex of pigeon pea. In the present investigation it was clearly observed that this recommendation does not satisfy the pest management strategies for all varieties having early and late duration and more studies in this aspect are to be conducted in future.

5. References

1. Davis JC, Lateef SS. Pulse entomology, Annual Report (1975-76). Part-A. pigeon pea entomology, ICRISAT, Hyderabad (A.P), India, 1977.
2. Gomez KA, Gomez AA. Statistical procedures for agricultural research. (2nd edn.) book of rice research institute Philippines. A wiley inter Sci. pub. John Wiley and Sons, New York, 1984, 680.
3. Karmakar K, Patra S. Bio-efficacy of some new insecticide molecules against pod borer complex of red gram. Leg. Res. 2015; 38(2):253-259.
4. Patange NR, Chiranjeevi B. Bioefficacy of newer insecticides against pigeon pea (*Cajanus cajan* L. Millsp.) pod borers. J of Ent. and Zoo. Stu., 2017; 5(3):28-31.
5. Priyadarshini G, Reddy NC, Reddy DJ. Bioefficacy of selective insecticides against lepidopteran pod borers in pigeon pea, Ind. J of Pl. Prote., 2013; 41(1):6-10. 26 (1, 2):62-66.
6. Raut SP, Turkhade PD, Gurve S. Evaluation of newer insecticides against pod borer complex at different stages of pigeon pea. Advances in life Sci. 2016; 5(5):1785-1788.
7. Shinde SV, Kadam DR, Sonkamble MM, Kadam BS. Influence of different spraying dates on pod borer complex of pigeon pea. Agric. 2017; 12(3):597-604.
8. Wadaskar RM, Jadhao VP, Bhalkare SK, Patil AN. Calendar based application of new insecticides for the management of pod borer complex in pigeon pea. J of Food Legumes. 2012; 25(3):215-221.