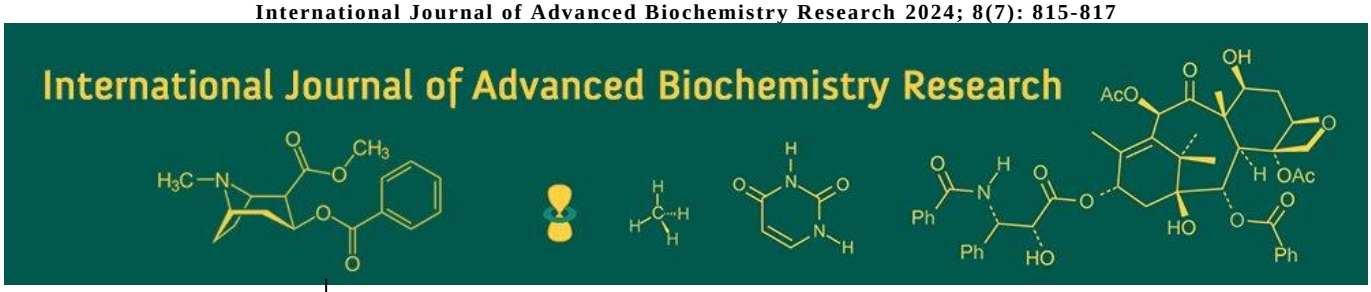

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Supervisory management of pod fly, *Melanagromyza obtusa* Malloch (Diptera: Agromyzidae) in pigeonpea variety GRG 811 sown on different dates

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Abstract
A field experiment was carried out during kharif 2019-20 on supervisory management of pod fly in pigeonpea variety GRG 811 sown on different dates with insecticides recommended in package of practices. It was found that need based application of imidacloprid 17.8 SL 0.20 ml + jaggery 10 g l^{-1} as first spray and thiamethoxam 25 WG 0.2 g + jaggery 10 g l^{-1} as second spray at 15 days interval effectively controlled pod fly in crop sown on 20th July. While, crops sown on 5th August and 20th August required three sprays, indicating higher pest incidence in late sown crops necessitating an additional spray.

Keywords: Supervisory management, pod fly, pigeonpea, insecticides

Introduction
Pigeonpea (*Cajanus cajan*), commonly referred to as red gram or arhar, is a versatile leguminous crop of immense agricultural significance worldwide. It stands out for its nutritional value, serving as a crucial source of dietary protein, essential amino acids, vitamins and minerals, particularly in regions where access to animal protein is limited (Saxena *et al*. 2010; Varshney *et al*. 2010) [11, 15]. Beyond its nutritional benefits, pigeonpea contributes to sustainable agriculture through nitrogen fixation, enhancing soil fertility and reducing dependence on synthetic fertilizers.

However, pigeonpea production faces numerous challenges, among which biotic stresses, especially insect pest damage, pose significant constraints. About 250 insect species belonging to 8 orders and 61 families have been found to infest pigeonpea from seedling to harvesting stage and virtually no plant part is free from insect infestation (Upadhyay *et al*. 1998) [14]. Pod fly, *Melanagromyza obtusa* emerged as a major threat inflicting 21.00 to 38.50 percent pod damage, 12.29 to 19.87 percent grain damage (Khan *et al*. 2014) [4] and 31.35 percent mean pod damage (Patra *et al*. 2016) [8]. However, the yield loss of 60 to 80 percent was recorded due to the pod fly in pigeonpea (Durairaj, 2006) [3].

Farmers commonly combat pod fly infestations through frequent application of insecticides. Shanower *et al.* (1999) [12] found that farmers in southern India had to spray 3 to 6 times in a season without much success and economic benefits. Despite their effectiveness in controlling pests, excessive use of insecticides can lead to environmental contamination, harmful effects on non-target organisms and the development of insecticide resistance among pest population. Such practices not only escalate production costs but also pose risks to human health and ecosystem sustainability. Further, the sowing dates plays a crucial role in pest incidence, likely due to variations in weather conditions (Cumming and Jenkins, 2011) [2]. Early-planted crops experience lower pest populations and consequently yield increases compared to late-planted crops (Prasad *et al*. 2012) [9]. Thus, selecting the appropriate sowing period serves as an essential, cost-effective and eco-friendly tool in pest management.

To address these challenges sustainably, there is a growing emphasis on need-based application strategies for insecticide use in pigeonpea farming systems. Need-based application involves applying insecticides judiciously based on pest thresholds and crop growth stages, optimizing efficacy while minimizing environmental impact.

This approach not only enhances pest management efficiency but also supports integrated pest management (IPM) practices that promote long-term sustainability in agriculture.

Materials and Methods

Pigeonpea variety GRG 811 was sown in plots of 5.4 m × 4.8 m on three dates *viz*., 20-07-2019, 05-08-2019 and 20-08-2019 under both protected and unprotected conditions during kharif 2019-20 at Zonal Agricultural Research Station, Kalaburagi, University of Agricultural Sciences, Raichur, Karnataka, India. Kalaburagi is situated in North eastern dry zone of Karnataka between 16º 16' latitude and 77º 20' longitudes and at 389 meters above mean sea level. The crop was raised by following the standard agronomic practices as per the package of practices of UAS Raichur (Anonymous, 2017) [1]. In protected plots, pod fly was managed by spraying with the recommended chemicals in package of practices *i.e*., Imidacloprid 17.8 SL 0.20 ml + jaggary 10 g l^{-1} as first spray and second spray with Thiamethoxam 25 WG 0.2 g + jaggary 10 g l^{-1} at 15 days after first spray (Anonymous, 2017) [1]. First Spraying was done based on the incidence of pod fly *i.e*., when the seed damage due to pod fly crossed 5 percent. Subsequent sprays were taken up on need basis at 15 days interval after first spray whenever seed damage crossed five percent.

For recording observations on pod and seed damage, fifty pods were randomly collected from each unprotected and protected plots at weekly intervals and seeds were separated. These seeds were examined for healthy and infested one and accordingly, the pod and seed damage caused by pod fly was calculated (Pathade *et al*. 2015) [7]. The data on pod and seed damage recorded at weekly interval from pod formation to maturity from unprotected and protected plots was subjected to statistical analysis and the significance was tested by "t" test.

Results and Discussion

Pod fly infestation prevailed in the field from 46th SMW to 3rd SMW on GRG 811 variety. Pod and seed damage varied significantly in protected plots compared to unprotected plots after first and subsequent sprays (Table 1). Two sprays were sufficient to manage pod fly in 20th July sown crop of GRG 811. However, three sprays were given for 5th August and 20th August sown crop. In unprotected plots, the pod damage at maturity was 28.80, 34.40 and 40.80 percent; and seed damage was 19.32, 23.71 and 30.56 percent in the crop sown on 20th July, 5th August and 20th August, respectively. While, in protected plots, pod damage by pod fly at maturity was 12.80, 15.20 and 21.60 percent; and seed damage of 7.50, 9.04 and 16.70 percent in 20th July, 5th August and 20th August sown crop, respectively (Table 1).

Table 1: Supervisory management of pod fly in pigeonpea variety GRG 811 sown on different dates

Date of observation	S M W	Pod damage (%)		t_{cal}	Seed damage (%)		t_{cal}
		Unprotected	Protected		Unprotected	Protected	
Crop sown on 20-07-2019							
14-11-2019	46	4.00	4.00	0	2.72	2.73	0.05
21-11-2019 (I)	47	9.60	10.40	0.50	5.03	5.13	0.56
28-11-2019	48	12.80	7.20	3.30*	9.53	3.39	19.28*
05-12-2019	49	16.00	8.80	4.81*	12.57	4.36	19.99*
12-12-2019 (II)	50	20.80	12.00	4.49*	15.21	6.99	20.54*
19-12-2019	51	24.00	11.20	6.53*	17.96	6.10	21.40*
26-12-2019	52	28.80	12.80	7.55*	19.32	7.50	20.15*
Mean		16.57	9.48		11.76	5.17	
Crop sown on 05-08-2019							
28-11-2019	48	7.20	7.20	0	3.51	3.45	0.56
05-12-2019 (I)	49	12.80	12.00	0.40	6.12	6.24	0.30
12-12-2019	50	17.60	9.60	5.77*	12.74	4.71	19.77*
19-12-2019 (II)	51	21.60	11.20	8.22*	15.27	5.76	18.88*
26-12-2019	52	24.80	10.40	11.38*	18.71	5.27	23.03*
02-01-2020 (III)	1	28.80	13.60	12.01*	21.39	8.44	23.92*
09-01-2020	2	34.40	15.20	10.73*	23.71	9.04	18.60*
Mean		21.02	11.31		14.49	6.13	
Crop sown on 20-08-2019							
05-12-2019	49	7.20	7.20	0	4.14	4.10	0.27
12-12-2019 (I)	50	14.40	13.60	0.57	8.39	8.37	0.08
19-12-2019	51	19.20	12.80	3.02*	13.74	7.53	12.57*
26-12-2019 (II)	52	26.40	16.00	6.50*	18.62	10.53	14.12*
02-01-2020	1	31.20	13.60	13.91*	23.61	8.66	17.27*
09-01-2020 (III)	2	36.80	18.40	8.39*	28.62	12.95	24.66*
16-01-2020	3	40.80	21.60	10.73*	30.56	16.70	27.79*
Mean		25.14	14.74		18.24	9.83	

SMW: Standard Meteorological Week

*Significant at 5% level of significance; $t_{tabulated} = 2.30$

I- First spray, II- Second spray, III-Third spray

The results indicated that need based application of recommended insecticides (Imidacloprid 17.8 SL 0.20 ml + jaggery 10g l^{-1} as first spray when seed damage crossed 5 percent and second spray with Thiamethoxam 25 WG 0.2 g + jaggery 10g l^{-1} at 15 days after first spray on need basis) was effective against pod fly for the crop sown on 20th July. These results were in close agreement with earlier work by Kumar and Nath (2003) [5] who observed the insecticides

applied two times first at flowering to podding stage and second at 25 days after the 1st application was superior over the single application *i.e*., at flowering or podding stage. Singh *et al.* (2001) [13] opined dimethoate, monocrotophos and fenvelarate were best in managing pod fly when applied once during pod formation stage and the other at fifty percent podding stage. In present investigation, 5th August and 20th August sown crop required three sprays which indicated that late sown crop harbor more pest incidence that demands one more extra spray. Similar findings were reported by Pandao *et al.* (1993) [6] who noticed that the pod fly was effectively managed when three applications of triazophos (0.07%) and monocrotophos (0.04%) were given (first at 30% flowering, 2nd and 3rd at an interval of 15 days). Rao and Rao (2006) [10] found spraying fenvalerate 20 EC (0.02%) three times on ICPL-85063 was effective in reducing pod fly damage.

Conclusion

The need-based application of imidacloprid 17.8 SL at 0.20 ml + jaggery 10 g l^{-1} of as the first spray, followed by thiamethoxam 25 WG at 0.2 g + jaggery 10 g l^{-1}as second spray, at 15 day interval, effectively controlled pod fly in crop sown on 20th July. However, crops sown on 5th August and 20th August required three sprays, reflecting a greater pest pressure in late-planted crops, which necessitated an additional treatment.

Conflict of Interest

The authors declare no conflict of interest

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References

1. Anonymous. Package of practices, University of Agricultural Sciences, Raichur; c2017.
2. Cumming G, Jenkins L. Chickpea: Effective crop establishment, sowing window, row spacing, seeding depth and rate. Northern Pulse Bull. 2011;7: 6.
3. Durairaj C. Evaluation of certain neem formulations and insecticides against pigeonpea pod fly. Indian J Pulses Res. 2006;19(2):269-270.
4. Khan M, Srivastava CP, Sitanshu. Screening of some promising pigeonpea genotypes against major pests. Ecoscan. 2014;6:313-316.
5. Kumar A, Nath P. Field efficacy of insecticides against pod bug (*Clavigrella gibbosa*) and pod fly (*Melanagromyza obtusa*) infesting pigeonpea. Ann Plant Prot Sci. 2003;11(1):31-34.
6. Panda SK, Maharajan KR, Muqueem A, Aherkar SK, Thakure HS. Efficacy of some insecticides against tur pod borers on semi rabi arhar (*Cajanus cajan* L.) var C-11. PKV Res J. 1993;17(2):229-230.
7. Pathade PM, Salunke PB, Borkar SL. Evaluation of some insecticides against pigeonpea pod fly, *Melanagromyza obtusa* Mall. Indian J Agric Res. 2015;49(5):460-463.
8. Patra S, Firake DM, Thakur NSA, Roy A. Insect pest complex and crop losses in pigeonpea in medium altitude hill of Meghalaya. The Ecoscan. 2016;11(1):297-300.
9. Prasad D, Bhan C, Sharma V, Prasad H. Effect of various plant geometry on chickpea (*Cicer arietinum*) under different dates of sowing: A Review. J Progress Agric. 2012;3(2):113-117.
10. Rao NM, Rao PS. Evaluation of insecticides against pod borer, *Helicoverpa armigera* (Hubner) and pod fly, *Melanagromyza obtusa* (Malloch) of pigeonpea. J Plant Prot Environ. 2006;3(2):43-45.
11. Saxena KB, Kumar RV, Sultana R, Mallikarjuna N. Pigeonpea: a legume crop for food security. J SAT Agric Res. 2010;8:1-14.
12. Shanower TG, Romeis J, Minja EM. Insect pests of pigeonpea and their management. Ann Rev Ent. 1999;44:77-96.
13. Singh DP, Singh RP, Singh SK, Kumar A. Evaluation of certain insecticides against major insect pests of pigeonpea. Ann Plant Prot Sci. 2001;9(2):313-314.
14. Upadhyay RK, Mukerji KG, Rajak RL. IPM system in Agriculture, 4 pulses, New Delhi. 1998;P.99.
15. Varshney RK, Graner A, Sorrells ME. Pigeonpea genomics initiative (PGI): An international effort to improve crop productivity of pigeonpea (*Cajanus cajan* L.). Mol Breed. 2010;26:393-408.