Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2018; 6(6): 75-77

Received: 16-09-2018
Accepted: 18-10-2018

Goutam B Hosamani
M.sc (Agri) in Agricultural Entomology (Research) College of Agriculture, Science Vijayapura, University of Agricultural Science, Dharwad, Karnataka, India

SB Jagginavar
Professor of Department of Agricultural Entomology College of Agricultural Science Vijayapura, University of Agricultural Science, Dharwad Karnataka, India

SS Karabhantanal
Assistant Professor Department of Agricultural Entomology and Senior Scientist Aicrp On Sorghum, Rars, University of Agricultural Science, Dharwad, Karnataka, India

Correspondence
Goutam B Hosamani
M.sc (Agri) in Agricultural Entomology (Research) College of Agriculture, Science Vijayapura, University of Agricultural Science, Dharwad, Karnataka, India

Evaluation of insecticides on field carryover of pulse beetle *Callosobruchus chinensis* (L.) (Coleoptera: Bruchidae) in greengram and cowpea varities

Goutam B Hosamani, SB Jagginavar And SS Karabhantanal

Abstract
The study was to investigate the evaluation of insecticides on oviposition of pulse beetle C*allosobruchus chinensis* (L.) (Coleoptera: Bruchidae) in greengram varities and cowpea varities at Agriculture college Vijajapura, UAS Dharwad during *Kharif* 2014-15. Among the greengram genotypes, the least number of oviposition was recorded in S-4 (22.94).Significantly the highest number of eggs was recorded in shinning moong variety (27.41). Among the insecticides NSKE @ 5 percent (18.51) and malathion 50EC (23.07) are promising in the control of field carryover of pulse beetle in greengram whereas in cowpea genotypes minimum numbers of eggs were recorded in C-152 cowpea genotypes (28.60) Significantly the highest number of eggs were registered in DCS 47-1 (29.54) None of the insecticides were promising in control of Ovipostion of pulse beetle but field carry over can be minimized to certain extent by malathion 50EC and botanicals such as NSKE 5 % and castor oil in both green gram and cowpea crops. This indicates that the infestation is from field to laboratory.

Keywords: *Callosobruchus chinensis*, Pulse beetle, oviposition and field carryover

1. Introduction
Pulses (grain legumes) are the second most important group of crops worldwide. Globally, 840 million people are under nourished mainly on account of inadequate intake of proteins, vitamins and minerals in their diets. Pulses are excellent sources of proteins (20-40%), carbohydrates (50-60%) and are fairly good sources of thiamin, niacin, calcium and iron. Out of total 12.6 million tons, 5.5 % is lost due to the non-availability of proper storage facilities with the farmers and vulnerability of pulses to stored grain pests which inflict severe losses mainly in the storage Pandey and Singh [1].

One of the major constraints in production of pulses is the insect pests which inflict severe losses both in the field and storage. In India, over 200 species of insects have been recorded infesting various pulses.

According to ecological interpretation, the family bruchidae can be divided into two major categories *viz.*, store bruchids and field bruchids Southgate [2]. The field infestation of pulse by these beetles acts as a potential source of initiation of population buildup during post-harvest period in stores Khanvilkar and Dalvi [3]. These bruchids are known to lay eggs on the pods of different pulses and grubs burrow through the chorion of eggs directly into the pod wall and seed coat and then into the seed where the grubs develop and pupate to finally emerge as adults from the pod itself.

It is well-established fact that lot of efforts should be put for the production of “every single grain” but this is of no use if the produced seeds are not saved, which recalls the proverb “a grain saved is a grain produced”. This adage depends mainly on how best we protect the quality of grains during storage. Among the storage pests, bruchids is cur greater importance. Among the bruchids, pulses beetles *C.maculatus, C. chinensis*, *C.phaseoli*, *C.theobromae* and *C.analis* are major pests causing serious damage and are cosmopolitan in distribution. Pulses suffer losses both qualitatively and quantitatively by this pest due to this habit Gujar and Yadav [4]. These are known to feed and breed on different pulses. Knowledge of the host range and biology of the pest species are essential to minimize the incidence. Considering the economic importance of this pest, an attempt has been made to study field carryover of pulse beetle in green gram crop.

2. Material and Methods

The experiment was conducted in *kharif* season 2014-15 Vijayapura is situated in the North dry zone (Zone-III) of Karnataka between 16^0 2 latitude and 76^0 42 longitude with an altitude of 593.8 meters above the mean sea level. The annual average rainfall was 525.5mm with a mean maximum temperature of more than 30 ºC throughout the year except during December.

The greengram and cowpea crop (farmer field) was sown in the field of college of Agriculture, Vijayapura under rainfed condition. The experiment was laid out in split plot design in three replications with nine treatments. The main plot had varieties of greengram and (BGS-9, S-4 and Shinning moong) and cowpea varities (C-152, DC-15 and DCS 47-1) and Sub plot treatments insecticides sprayed one at physiological maturity stage and second spray at a day before harvest. Observations were recorded on Number of eggs per 5 pods /5 plants in the field. The results are statistical analyzed. The mean values of treatments are subjected to Duncan's Multiple Range Test (DMRT).

3. Results and Discussion

The results on the effect of insecticides on oviposition of pulse beetle *callosobruchus chinensis* (L) (Coleoptera: Bruchidae) in greengramand cowpea genotypes are presented.

Effect of pre-harvest application of different insecticides on the oviposition preference on different greengram and cowpea genotypes.

It is evident from the (Table 1) that the main treatments (genotypes) and sub treatments varied significantly in pre-harvest management.

Among the genotypes, significantly higher numbers of eggs per 5 pods per 5 plants were recorded in shinning moong (27.41). The least number of eggs were recorded on S-4 (22.94) followed by BGS-9 (24.67) (Table 1).

Among the sub treatments Table 1 (insecticides), the pre-harvest application of insecticides in management of bruchids in the field varied significantly on oviposition (Table 1). The least number of eggs per 5 pods per plant were recorded in cypermethrin 10EC @ 0.50ml/l (16.62) followed by NSKE 5 per cent (18.51), castor oil 1% (22.52), fenvalerate 20 EC @ 0.50 ml/l (22.80), malathion 50EC @ 2ml/l (23.07), neem oil @ 5 ml/l (28.36), fenvalerate 0.4 DP @ 25 kg/ha (28.80), malathion 5D @ 25 kg/ha (29.31).The highest mean number of eggs were recorded in untreated control (35.07).

It is evident from (Table 2) that the main treatments (genotypes) and insecticide sprays (one at physiological maturity stage and second at a day before harvest) varied significantly with respect to the oviposition of bruchids on cowpea genotypes.

Among the genotypes, minimum numbers of eggs were recorded in C-152 cowpea genotypes (28.60 eggs/5 pods/5 plants), which was on par with DC-15 genotype (29.30 eggs/5 pods /5 plants) (Table 2).Whereas, the highest number of eggs /5 pods /5 plants were registered in DCS 47-1 (29.54).

Among the insecticides, number of eggs /5 pods /5 plants were significantly lowest in cypermethrin 10EC 0.50 ml/l (22.43) treatments and was followed by NSKE 5% (23.36), castor oil @ 1% (25.98), fenvalerate 20EC @ 0.50 ml/it (26.59) and malathion 50EC @ 2ml/l (28.61) which were on par with each other. The significantly higher numbers of eggs were observed in untreated control (Table 2).

Interaction effect of genotypes and pre-harvest treatments of insecticides were found to be significant. Where in, application of cypermethrin 10EC @ 0.50 ml/l in S-4 greengram genotype recorded significantly lower number of eggs/5 pods/5 plants (16.42) while it was highest in Shinning moong genotype (18.62) whereas in cowpea genotype cypermethrin 10EC @ 0.50ml/l in C-152 cowpea genotype recorded significantly lower number of eggs/5 pods/5 plants (22.66) while it was highest in DCS 47-1 genotype (23.46).Cypermethrin is a composite non-systemic pyrethroid; a broad spectrum, non-cumulative insecticide, and a fast-acting neurotoxin with good contact and stomach action. Cypermethrin acts as a stomach and contact insecticide. Its structure is based on pyrethrum, a natural insecticide which is contained in chrysanthemum flowers. It is a synthetic pyrethroid insecticide in which the active ingredient is Cypermethrin and the balance is other adjuvant ingredients. NSKE 5 % used against household, storage pests and crop pests. NSKE as a biopesticide at different levels and in various ways acts as a pest fumigant is available in gaseous state and is used as a pesticide and disinfectant natural fumigant not only kills pests but also affects them negatively by acting as feeding and oviposition deterrence, mating disruption, inhibition of growth etc. It acts as oviposition deterrent *ie*., by not allowing the female to deposits eggs comes in very handy when the seeds in storage are coated with neem kernel powder and/or neem oil. It also acts as insect growth regulator. It is a very interesting property of neem product and unique in nature, *ie*., it works on juvenile harmone.

The present findings are in agreement with the report of Khanvilkar and Dalvi [3] reported that, dusting with 10 per cent BHC, 10 per cent of carbaryl, spray solution of 0.05 per cent of malathion, 0.05 per cent, monocrotophos, 0.05 per cent of cypermethrin and 0.05 per cent of endosulfan insecticidal application failed to reduce the carryover of the pest from field to store even with two sprays at an interval of 15 days starting from 40 days after sowing of greengram. Kulkarani [5] who tried as a pre harvest spray on field bean against *C. theobromae* with quinolphos, monocrotophos, dimethoate, chlorpyriphos, fenvalerate, methyl parathion, endosulfan and malathion. None of the insecticides were able to prevent the field infestation completely. Results can be concluded that cypermethrin which may be due to its more efficacy and NSKE may act as a feeding deterrent and growth regulator, repelling, disrupting the growth and reproduction of bruchids.

4. Conclusion

In recent years, availability of pulses is reduced mainly due to attack of insect pests both in field and storage conditions. Majority of the pulses are susceptible to insect pests, which is mainly because of lack of proper management practices. The infestation starts from field to storage. None of the insecticides were able to prevent the field infestation completely. Spraying botanical and oils prevent the losses in storage structures and warehouses protection of grains to some extent of two months to three months in storage from bruchids as Pre-harvest management mechanism.

5. Acknowledgement

The Authors are thank full to Dr. S. B. Jagginavar Professor of the Department of Agricultural Entomology and Dr. S. S. Karabhantanal Assistant professor of Entomology Department of Agricultural Entomology, College of Agricultural Science Vijayapura-586101, University of Agricultural Science, Dharwad for facilities and their support and help throughout the course of work.

Table 1: Effect of field application pre-harvest application of different insecticides on the oviposition preference of different greengram genotypes.

Treatments	*Oviposition preference (No. of eggs/5 pods /5 plants)			
Chemicals with Dose	**BGS-9**	**S-4**	**shinning moong**	**Mean**
Malathion 50 EC @2ml/l	23.26 (8.84)	21.81 (8.61)	24.14 9.00)	23.07 (8.82)[c]
Malathion 5 D @25kg/ha	28.14 (9.66)	25.23 (9.18)	34.55 (10.59)	29.31 (9.81)[d]
NSKE 5 %	17.66 (7.87)	17.40 (7.82)	20.4 (8.39)	18.51 (8.03)[b]
Neem oil @ 5ml/l	28.41 (9.70)	24.87 (9.12)	31.79 (10.19)	28.36 (9.67)[d]
Cypermethrin 10 EC@ 0.50ml/l	14.81 (7.30)	16.42 (7.61)	18.62 (8.04)	16.62 (7.65)[a]
Fenvalerate 20 EC@ 0.50 ml/l	22.56 (8.73)	21.17 (8.51)	24.66 (9.07)	22.80 (8.77)[c]
Fenvalerate 0.4 DP @ 25kg/ha	28.68 (9.74)	34.10 (9.04)	33.46 (10.4)	28.80 (9.73)[d]
Castor oil@ 1%	21.90 (8.64)	21.17 (8.51)	24.49 (9.06)	22.52 (8.74)[c]
Untreated control	36.58 (10.86)	34.10 (10.53)	27.41(10.4 D8)	35.07 (10.63)[e]
Mean	24.67 (9.04)[b]	22.94 (8.77)[a]	27.41 (9.47)[c]	25.00 (9.09)
For comparison	SEm±		CD@5%	
Variety(V)	0.026		0.11	
Insecticides(I)	0.088		0.25	
V at same level of I(V×I)	0.153		0.42	
I at same or different level of V(I×V)	0.147		0.43	

*Figures in the parenthesis are square root transformed values$\sqrt{x+1}$

Table 2: Effect of field application of pre-harvest of different insecticides on the oviposition Preference of different cowpea genotypes

Treatments	*Oviposition preference (No. of eggs/5 pods / 5 plants)			
Chemicals with Dose	**DCS 47-1**	**DC 15**	**C-152**	Mean
Malathion 50 EC @ 2ml/l	31.59 (10.18)	27.40 (9.54)	26.85 (9.45)	28.61 (9.72)[b]
Malathion 5 D @ 25kg/ha	36.64 (10.83)	34.11 (10.45)	30.18 (9.97)	33.64 (10.41)[c]
NSKE 5 %	18.07 (9.73)	26.11 (9.30)	25.91 (9.31)	23.36 (9.44)[b]
Neem oil @ 5ml/l	32.21 (10.94)	30.25 (9.96)	29.96 (9.91)	30.80 (10.27)[c]
Cypermethrin 10 EC @ 0.50ml/l	23.46 (9.14)	21.19 (8.89)	22.66 (8.73)	22.43 (8.92)[a]
Fenvalerate 20 EC @ 0.50 ml/l	26.68 (9.89)	26.38 (9.37)	26.71 (9.41)	26.59 (9.55)[b]
Fenvalerate 0.4 DP @ 25kg/ha	32.39 (10.92)	30.54 (10.02)	31.95 (10.22)	31.62 (10.38)[c]
Castor oil @ 1%	26.24 (9.90)	25.44 (9.22)	26.28 (9.35)	25.98 (9.49)[b]
Untreated control	40.85 (11.39)	40.05 (11.28)	36.89 (10.89)	39.26 (11.18)[d]
Mean	29.54 (10.32)[b]	29.30 (9.78)[a]	28.60 (9.69)[a]	29.15 (9.93)
For comparision	SEm±		CD @ 5%	
Variety (V)	0.06		0.26	
Insecticides (I)	0.10		0.30	
V at same level of I (V×I)	0.18		0.52	
I at same or different level of V(I×V)	0.18		0.55	

*Figures in the parenthesis are square root transformed values$\sqrt{x+1}$

6. References

1. Pandey NK, Singh SN. Uttar Pradesh J Zoology. 1997; 17:38-42.
2. Southgate BJ. Biology of Bruchidae. Annu. Rev. Entomol. 1979; 24:449-473.
3. Khanvilkar SV, Dalvi CS. Carryover of pulse beetle, *Callsobruchus maculates* (F.) infestation from field and its control. Bull.Grain Tech. 1984; 22(1):54-61.
4. Gujar GK, Yadav TD. Feeding of Callosobruchus *maculatus* (F.) and *Callosobruchus chinensis* (L.) in greengram. Indian J. Entomol. 1978; 40(2):108-112.
5. Kulkarani SB. Bioecology and management of *callosobruchus theobromae* (L). (Coleopteran: Bruchidae) infesting fieldbean (*Lablab purpureus* Linn.). M.sc (Agri.) Thesis, Uni. Agri. Sci., Bangaluru (India), 1990.