Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.6155

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (1):** 779-783 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Survey on Incidence of *M. vitrata* in Blackgram and Greengram and Insecticide Usage in Major Growing Areas of Southern Zone of Andhra Pradesh During Late *Kharif*, 2014

L. Pedda Venkata Reddy* and K. V. Hari Prasad

Department of Entomology, Agricultural College, Tirupati-517 502, Chittoor District, Andhra Pradesh, India

*Corresponding Author E-mail: venki.ag.25@gmail.com

Received: 9.01.2018 | Revised: 12.02.2018 | Accepted: 16.02.2018

ABSTRACT

A survey was conducted during late kharif, 2014 in three districts of the Southern zone (Nellore, Kadapa and Chittoor districts) of Andhra Pradesh for information on per cent Maruca infestation, genotype preference (blackgram and greengram) by the farmers and insecticidal usage against spotted pod borer. Maruca infestation was seen more in Kadapa district both in blackgram and greengram. In blackgram, the genotype LBG-752 (62.2 %) and in greengram LGG-460 genotype (59.3 %) occupied more area in cultivation. Among the insecticides, the Chloropyrifos was used more i.e., 51.9 % in blackgram and 54.1 % in greengram in the Southern zone against the spotted pod borer infestation.

Key words: *M.vitrata, Black gram, Green gram, Chlorpyrifos.*

INTRODUCTION

Pulse crops play an important role in maintaining soil health and supplying protein to large masses of the people in this country. India grows a variety of pulse crops under a wide range of agro-climatic conditions and has a pride of being the world's largest producer of pulses. The most commonly grown pulses in India include chickpea, pigeonpea, blackgram, greengram, fieldbean, horsegram, etc. Pulses form an important component of Indian agriculture, in view of their unique capacity to fill the dietary requirements of majority of vegetarian population of rural India, besides replenishing soil fertility through their sustainable characters. India cultivated pulses in 232.56 lakh hectares with an average production of 18.34 million tonnes in 2012-13 (Annual Report of Department of Agriculture and Cooperation, 2013-2014).

Blackgram (*Vigna mungo* (L) Hepper) and Greengram (*Vigna radiat*a (L) R.Wilczek) are the two important short-duration pulse crops grown in many parts of India. These crops are grown in different cropping systems as a mixed crop, catch crop, sequential crop, besides as sole crop under residual moisture conditions after the harvest of paddy and also.

Cite this article: Reddy, L.P.V. and Hari Prasad, K. V., **S**urvey on Incidence of *M. vitrata* in Blackgram and Greengram and Insecticide Usage in Major Growing Areas of Southern Zone of **A**ndhra Pradesh During Late *Kharif*, 2014, *Int. J. Pure App. Biosci.* **6(1):** 779-783 (2018). doi: http://dx.doi.org/10.18782/2320-7051.6155

Before and after the harvest of other summer crops under semi-irrigated and dry land conditions. In India, blackgram and greengram are very popularly grown in Andhra Pradesh, Bihar, Madhya Pradesh, Maharashtra, Uttar Pradesh, West Bengal, Punjab, Haryana, Tamil Nadu and Karnataka with an area of about 4.29 million hectares with a total production of 1.90 million tonnes with an average productivity of 485-500 kg ha^{-1} (Directorate of Economics and Statistics, Government of Andhra Pradesh, 2011-12). Andhra Pradesh ranks first in productivity followed by Orissa. In Andhra Pradesh, the maximum area under these crops during *kharif* is in coastal region with Guntur district ranking first in production in Andhra Pradesh.

Both blackgram and greengram are affected by important insect pests such as spotted pod borer, *Maruca vitrata* (Geyer), plume moth, *Exelastis atomosa* (Walsingham), gram pod borer, *Helicoverpa armigera* (Hubner), red hairy caterpillar, *Amsacta moorei* (Butler) and leaf hopper, *Empoasca kerri* (Pruthi). About 15-30 % of the yield loss occurs due to insect pests in pulse crops[12].

The spotted pod borer, *M vitrata* is a serious pest of grain legume crops including mungbean, urdbean, pigeonpea and common beans[3]. It attacks crops right from the pre-flowering to pod maturing stage causing considerable yield loss. Singh[10] reported 70-80 % yield loss in pigeonpea, whereas it was 17-53 % in cowpea[7] and 100 % in urd bean[5]. In pigeonpea, losses due to *M. vitrata* have been estimated to be $ US 30 million annually[6]. Vishakantaiah and Jagadeesh Babu[13] observed between 9 and 51% infestation in red gram. The larvae of *M. vitrata* feeds on flowers, buds, and pods by webbing with leaves[9]. This webbing behaviour protects the larvae from both biotic and abiotic conditions and this behaviour also makes it difficult to manage the insect by synthetic chemicals. The repeated use of older class chemicals such as chlorpyriphos, acephate, dichlorovos etc., have resulted in development of resistance to insecticides. Presently, attempts are being focused on use of safer insecticides, plant products and microbial pesticides to reduce the resistance development and to maintain safety of the environment. Host Plant Resistance offers one of the best insect pest management strategy which is environmentally safe and with no additional cost incurred to the farmers.

MATERIAL AND METHODS

Survey on *M.vitrata* population in blackgram and greengram during late *kharif* 2014 was carried out in Chittoor, Nellore and Kadapa districts. Roving survey was conducted and data on number of plants infested with spotted pod borer was recorded in 1 sq.mt area, to calculate the per cent damage. In each infested plant, total number of webbings were recorded. During the survey, insect infestation was recorded at different crop stages such as vegetative, flowering, pod formation and pod maturation.

Information on name of the varieties of blackgram and greengram, number of sprays, dosage and group of insecticides used was collected from 5 progressive farmers in each village. A total of 3 villages in each mandal was selected for the survey. Thus a total of 27 samples were collected from 27 villages of 3 districts.

RESULTS AND DISCUSSION

Percentage *Maruca vitrata* Infestation in Different Districts of Southern Zone of Andhra Pradesh

Blackgram

Out of the three districts surveyed, more per cent infestation of spotted pod borer was observed in Kadapa district (41.99 ± 6.84) followed by Nellore (39.77 ± 5.97) and Chittoor (38.50 ± 5.54) (Table 3.1).

Greengram

Nellore district (42.66 ± 6.54) recorded more per cent infestation of spotted pod borer followed by Kadapa (41.1 ± 6.93) and Chittoor (39.24 ± 5.91) (Table 3.1).

In all the districts of Southern zone of Andhra Pradesh, the per cent infestation of *Maruca vitrata* ranged from 12.66 % to 41.99 % (both blackgram and greengram).

The results of the investigation were supported by the observations of Singh[11] who carried out survey in Madhya Pradesh, to investigate the incidence of *Maruca testulalis* in pigeonpea and reported that the larvae causes a damage of 50-60 % of plants. Rani *et al.*[8] conducted survey and reported the flower infestation ranged from 11.5-29 % where as pod damage ranged from 18-27.5 %.

Table 3.1. Percentage infestation of *Maruca vitrata* in different districts of southern zone of Andhra Pradesh

Blackgram

S. No.	District	Mean ± S.D.
1	Nellore	39.77 ± 5.97
2	Kadapa	41.99 ± 6.84
3	Chittore	38.50 ± 5.54
Grand Mean		**40.08 ± 6.26**
C.V(%)		**15.32**

Greengram

S. No.	District	Mean ± S.D.
1	Nellore	12.66 ± 6.54
2	Kadapa	41.1 ± 6.93
3	Chittore	39.24 ± 5.91
Grand Mean		**41.00 ± 6.58**
C.V(%)		**15.80**

Genotypes of Blackgram and Greengram Preferred for Cultivation by the Farmers in Southern Zone of Andhra Pradesh

Blackgram

Five genotypes of blackgram were majorly cultivated in the Southern zone of Andhra Pradesh *viz.,* LBG-752, LBG-648, PU-31, LBG-123 and LBG-792. Out of these, LBG-752 (62.2 %) variety occupied the majority of the blackgram growing area followed by LBG-123 (17.8 %), LBG-792 (14.1 %), PU-31 (4.4 %) and LBG-648 (1.5 %) (Table 3.2).

Greengram

Six genotypes of greengram were cultivated in Southern zone of Andhra Pradesh *viz.,* LGG-460, LGG-407, LGG-480, LGG-406, PM-115 and LGG-450 were observed for growing. Among these, LGG-460 (59.3 %) occupied more area in cultivation followed by LGG-450 (22.2 %), PM-115 (11.1 %), LGG-406 (3 %), LGG-480 (2.2 %) and LGG-407 (2.2 %) (Table 3.2).

Most of the observed genotypes are grown traditionally since many years which were supplied by the SAUs and Dept. of Agriculture, and some of the farmers retain some of the harvested produce for growing in next coming seasons. Since the most preferred genotypes are bushy in nature, the natural enemies such as coccinellid beetles and dragonflies were observed on insect pests. The results of investigation were supported by the observations of Rani *et al*[8] who observed the coccinellids, *Cheilomenes sexmaculata* (Fabricius) along with spiders and ground spiders in the pulse ecosystem. Borah and Dutta[2] observed six hymenopterous parasitoids and five species of predators.

Table 3.2. Genotypes preferred by the farmers in southern zone districts of Andhra Pradesh

Blackgram

S. No.	Varieties	% Grown
1	LBG-752	62.2%
2	LBG-648	1.5%
3	PU-31	4. 4%
4	LBG-123	17.8%
5	LBG-792	14.1%
	Total(%)	**100**

Greengram

S. No.	Varieties	% Grown
1	LGG-460	59.3%
2	LGG-407	2.2%
3	LGG-480	2.2%
4	LGG-406	3%
5	PM-115	11.1%
6	LGG-450	22.2%
	Total(%)	**100**

Insecticide usage by the farmers of Southern zone of Andhra Pradesh against spotted pod borer infestation

Blackgram

From the survey data (Table 3.3), it was found that majority of the farmers preferred chlorpyriphos (51.9%) insecticide followed by the novaluron (20.7%), acephate (9.6 %), DDVP (8.9%), quinalphos (4.4%) and thiodicarb (4.4%) to control the spotted pod borer.

Greengram

From the survey data (Table 3.3), it was found that majority of the farmers preferred **i**nsecticide chlorpyriphos (54.1%) followed by

the DDVP (17.8%), novaluron (14.8%), acephate (8.1%), thiodicarb (4.4%) and quinalphos (0.7%) for spraying against *Maruca* infestation.

As pulse crops are infested with a number of insects belonging to different groups such as caterpillars, sucking insects etc., farmers generally rely on insecticides having a broad spectrum of activity which are at affordable price. It has been found from the present survey that farmers rely on an insecticide such as chlorpyriphos which has a broad spectrum of activity and which also possess fumigant action, to control different types of insects such as webbers as spotted pod borer, insects that are internal feeders such as pod fly and sucking insects such as aphids, jassids, thrips etc.,

Table 3.3. Insecticide usage by the farmers of southern zone of Andhra Pradesh against *Maruca vitrata* infestation

Blackgram

S. No.	Insecticide	% Usage
1	chloropyrifos	51.9
2	acephate	9.6
3	DDVP	8.9
4	novluron	20.7
5	quinalphos	4.4
6	thiodicarb	4.4
	Total(%)	**100**

Greengram

S. No.	Insecticide	% Usage
1	chloropyrifos	54.1
2	acephate	8.1
3	DDVP	17.8
4	novluron	14.8
5	quinalphos	0.7
6	thiodicarb	4.4
	Total(%)	**100**

CONCLUSIONS

From the survey, it was found that per cent *Maruca* infestation was more in Kadapa district followed by Nellore and Chittoor districts. In all the three districts surveyed, blackgram genotype LBG- 752 and greengram genotype LGG-460 was preferred by most of the farmers. Chlorpyrifos was preferred by most of the farmers for managing *Maruca* infestation in both blackgram and greengram.

REFERENCES

1. Annual report of Depatment of Agriculture and Cooperation, (2013-2014).
2. Borah, B. K and Dutta, S. K. Natural enemies of legume pod borer, *Maruca testulalis* (Geyer) in Jorhat, Assam. *Insect Environment*. **7(3):** 113-114 (2001).
3. Chandrayudu, E., Srinivasan, S and Rao, N. V. 2006. Incidence of *Maruca vitrata* in grain legumes in relation to plant characters. *Annals of Plant Protection Sciences.* **15(2):** 287-290 (2006).
4. Directorate of Economics and Statistics, Government of Andhra Pradesh, (2011-12).
5. Giraddi, R.S., Amaranath, K., Chandra Shekar, Kedamuri, B and Patil, R.S. Bioefficacy of new molecules of insecticides against gram pod borer (*Helicoverpa armigera*) in pigeonpea (*Cajanus cajan*). *Insect Environment.* 6: 1-24 (2000).
6. ICRISAT (International Crop Research Institute for Semi-Arid Tropics) *The medium term plan.* Patancheru 502324, Andhra Pradesh, India : (Limited distribution). *Bulletin of Entomological Research.* **81:** 123-126 (1992).
7. Liao, C.T and Lin, C. S. Occurence of the legume pod borer, *Maruca testulalis* (Geyer) (Lepidoptera: Pyralidae) on cowpea (*Vigna unguiculata* Walp) and its insecticidal application trial. *Plant Protection Bulletin.* 213-222 (2000).
8. Rani, C. S., Rao, G. R., Chalam, M. S. V., Patibanda, A. K and Rao, V. S. Summer season survey for incidence of *Maruca vitrata* (G.) (Pyralidae : Lepidoptera) and its natural enemies on greengram and other alternative hosts in main pulse growing tracts of Khammam district. *Journal of Research*. ANGRAU. **41(3):** 16-20 (2013).
9. Sharma, H.C., Saxena, K.B., and Bhagwat, V.R. The legume pod borer, *Maruca vitrata:* bionomics and management. Information Bulletin no. 55 (In En. Summaries in En, Fr.). Patancheru, 502 324, Andhra Pradesh, India: International

Crop Research Institute for the Semi-Arid Tropics. 42 (1999).

10. Singh, S.P. The ecofriendly approach. The Hindu: Survey of Indian Agriculture. 175-184 (1999).
11. Singh, U. C. Upsurge of *Maruca testulalis* on pigeonpea in northern Madhya Pradesh. *Indian Journal of Entomology*. **59 (2):** 236-237 (1997).
12. Tripathi, A.K., Yadav, K.S and Srivastava,V.P. Front line demonstrations on need based plant protection in pulses for enhancing productivity and profitability under farmers condition. *Scientific Research and Essays.* 164-167 (2015).
13. Vishakantaiah, M and Jagadeesh Babu, C.S. Bionomics of the tur web worm, *Maruca testulalis* (Lepidoptera: Pyralidae). *The Mysore Journal of Agricultural Sciences*. 14: 529- 532 (1980).