Indian Journal of Entomology, 81(4): 000-000 (2019) DoI No.:

INSECT PESTS OF BLACK GRAMIN RICE BASED FARMING

Abul Faiz* and Rezina Ahmed**

*Department of Zoology, Barama College, Barama 781346
**Department of Zoology, Cotton University, Guwahati 781001
*Email: itzfaizhere@gmail.com (corresponding author)

ABSTRACT

This study was conducted during August to November in 2016 and 2017 to record the insect pests that attack black gram grown in a sequential farming at rice nursery located in the village Dehar Kuriha under Hajo revenue circle of Assam. Thirteen insect species under Lepidoptera, Coleoptera, Orthoptera and Hemiptera were identified, with more than 50% belonging to the Hemiptera. Incidence and damage of *Omiodes indicata, Maruca testulalis* and *Apion clavipes* were found high. The highest mean density (227.2/ plot and 231.11/ plot) and relative density (21.8% and 22.2%) was found in *Apion clavipes*. Most of the insect pests made their appearance in the 39th standard week of the crop growth.

Key words: *Apion clavipes*, black gram, diversity, insect pests, *Maruca testulalis*, *Omiodes indicata*, species, orders, diversity indices, density

Black gram (*Vigna mungo* L. (Hepper)) occupies a very important place in the cuisines of the people specially living in Assam and northeast India. It is locally known as "mati mah".This crop is damaged by several insect pests leading to low production. Chhabra and Kooner (1985) found 54.3% losses caused by insect pest complex in black gram. Northeast India including Assam is a hotspot of biodiversity. The agro climatic condition varies within a favourable range for the growth and multiplication of insect pests (Thakur and Firake, 2015). Chandra and Rajak (2004) investigated the insect pests attacking black gram. Production of pulses in Assam is around 80000 MT (Agri Vision 2025), and it suffers from low productivity. Again to overcome the problem of insect pest, traditionally some cropping pattern has been practiced by people generation after generation. Sequential cropping is a system of cropping in which farmers cultivate two to three short duration crops in succession. In Assam, it is seen in Kamrup (Rural) district that some farmers sow their black gram seeds on the rice nursery. The composition of pest complex in the black gram cultivated in rice nursery may have some differences. Hence, the present study on the qualitative and quantitative composition of the insect pests and their damage to black gram in a rice based farming system.

MATERIALS AND METHODS

The experiment was carried out in a field located in the Village Dehar Kuriha in the District Kamrup (Rural) of Assam (26.3303^0 N, 91.5148^0 E) during August to November in 2016 and 2017. The climate of this area is tropical monsoon type having high humidity (17^{0}C to 33^{0}C, 80- 96 RH). The experiment was laid out in randomized block design with three replications and spacing between plot to plot was kept similar with the paddy nursery which had some raised bund of about 2 ft. in between two plots. The size of the nursery field was 668.5 m^2.The local variety of black gram "Saonia mah" was sown just before few days of transplantation of the rice. When the rice was ready to transplant, it was taken away and only the black gram plant remained and thereby a sequential cropping was done which helped to fertilize the nursery field naturally. No artificial fertilizer, pesticide or irrigation was practiced for the crop growth and the plots were surrounded by paddy crops.

The data on insect pests were recorded weekly by visual counts during August to November in 2016 and 2017 after two weeks of sowing from the three plots, five plants/ plot, from 6 to 8 am when the insects remain less active. After count, the insects were captured with sweep nets and aspirator, taken to the laboratory for identification and photographed in a Canon camera. Identification was done with relevant keys, and some were got identified at the ZSI, Kolkata. Quantitative estimation of the pests in different stages of crop growth was made from the data derived from field study. Species diversity, abundance and species richness indices were computed with Simpson diversity index, mean and relative density.

RESULTS AND DISCUSSION

The insect pests observed in 2016 and 2017 are listed in **Table** 1, and 13 insect pests were found on leaves, pods and flowers; *O. indicata*, the leaf weber fed on the green materials of the leaves and leaf curling occured to accommodate the pest. It is one of the most damaging insects found in this crop. *M. testulalis*, besides the pod damaging activities also acts as a leaf weber causing damage to the leaves. Most of the pests appeared in the field from 39th standard week (**Table** 2). *Apion clavipes* was found from starting to harvest, and showed

Table 1. Insect pests in black gram (2016 and 2017)

Sl. No.	Common name	Scientific name	Order/ Family	Nature of damage	Status of damage
1	Leaf weber	*Omiodes indicata*	Lepidoptera/ Pyralidae	Leaves	High
2	Bihar hairy caterpillar	*Spilosoma obliqua*	Lepidoptera/ Arctiidae	Leaves	Medium
3	Pod borer	*Maruca testulalis*	Lepidoptera/ Noctuidae	Leaves, pods	High
4	Blue butterfly	*Lampides boeticus*	Lepidoptera/ Lycaenidae	Flowers, Pods	Medium
5	Pulse beetle	*Callosobruchus maculatus*	Coleoptera/ Bruchidae	Pods	Low
6	Pod boring weevil	*Apion clavipes*	Coleoptera/ Apionidae	Buds, pods, flowers	High
7	Grasshopper	*Attractomorpha crenulata*	Orthoptera/ Pyrgomorphidae	Leaves	Medium
8	Grey weevil	*Myllocerosundecim-pustulatus*	Hemiptera/ Curculionidae	Leaves	Low
9	Pentatomid bug	*Nezara viridula*	Hemiptera/ Pentatomidae	Pods	Very low
10	Pod sucking bugs	*Riptortus linearis*	Hemiptera/ Coreidae	Pods	Medium
11	Pod sucking bugs	*Cletus bipunctatus*	Hemiptera/ Coreidae	Pods	Low
12	Aphid	*Aphis craccivora*	Hemiptera/ Aphididae	Leaves, stems, floral parts	Low
13	Leafhopper	*Empoasca kerri*	Hemiptera/ Cicadellidae	Leaves	Low

Table 2. Population/ plant of insect pests in black gram (2016, 2017)

Standard week	Mean number of insect/ plant per standard week												
	O. indicata	*L. boeticus*	*S. obliqua*	*M. testulalis*	*C. maculatus*	*M. undecim-pustulatuss*	*A. crenulata*	*A. clavipes*	*N. viridula*	*R. linearis*	*C. bipuncta-tus*	*A. craccivora*	*E. kerri*
35	--	0.23	--	--	--	--	0.10	0.90	--	--	--	--	--
36	0.07	0.27	--	0.20	--	--	1.03	1.83	0.10	--	--	--	0.70
37	0.23	0.43	--	0.27	--	--	1.60	2.07	0.23	0.40	--	1.70	1.30
38	0.80	0.67	1.30	0.27	0.03	--	2.07	2.55	0.27	0.87	--	4.13	2.40
39	1.30	0.80	2.20	0.30	0.01	0.07	2.37	4.10	0.47	1.80	--	5.64	2.53
40	1.10	1.20	2.60	0.43	0.01	0.27	2.53	4.10	0.46	1.77	0.07	3.10	2.60
41	0.60	0.60	1.60	0.33	0.06	0.37	1.70	3.27	0.47	2.03	0.27	4.94	2.33
42	0.45	0.17	0.73	0.20	0.10	0.13	1.30	2.43	0.20	1.46	0.40	1.23	2.30
43	0.60	0.23	0.27	0.67	0.10	0.13	0.57	1.63	0.30	0.87	0.33	0.77	--
44	0.07	0.23	0.30	0.20	0.20	0.10	0.40	1.53	0.28	0.90	0.23	1.30	0.50
45	0.10	--	0.77	--	0.17	0.10	0.37	1.60	0.23	0.63	--	2.07	0.83
46	--	0.17	0.27	0.40	0.23	0.17	0.67	1.13	0.07	0.33	--	--	0.27
47	--	--	--	--	0.17	--	--	0.20	0.07	0.47	0.10	--	0.07
SEm	0.14	0.10	0.29	0.05	0.03	0.04	0.24	0.33	0.04	0.18	0.05	0.59	0.30

SEm- Standard error of mean

Table 3. Mean/ relative density of insect pests in black gram (2016, 2017)

S. No.	Species	Mean Density	Relative Density %
1	*Omiodesindicate*	44.15	4.25
2	*Spilosoma oblique*	83.60	8.00
3	*Maruca testulalis*	27.21	2.65
4	*Lampides boeticus*	41.65	4.05
5	*Callosobruchus maculatus*	10.55	1.00
6	*Apion clavipes*	229.16	22.00
7	*Attractomorpha crenulata*	122.51	11.75
8	*Myllocerosundecimpustulatus*	11.11	1.10
9	*Nezara viridula*	25.02	2.40
10	*Riptortus linearis*	95.27	9.15
11	*Cletus bipunctatus*	11.66	1.15
12	*Aphis craccivora*	207.21	19.90
13	*Empoasca kerri*	131.39	12.63

Table 4. Diversity indices- insect pests of black gram (2016, 2017)

Year	Richness (S)	Abundance (N)	Relative abundance (RA)	Lepidoptera %	Coleoptera %	Orthoptera %	Hemiptera %	Diversity index
2016	13	1875	50.05	19.73	23.00	11.33	45.81	0.87
2017	13	1871	49.95	17.87	23.20	12.13	46.77	0.86

the maximum abundance, mean and relative density (**Table** 3), and Hemiptera had the maximum followed by Coleoptera (**Table** 4). The Simpson diversity index was more or less similar in all the surveyed plots in both the years. Jat et al. (2017) studied the incidence of major insect pests of black gramand found a quantitative abundance. Yadav et al. (2015) in their study recorded leafhopper, *Empoasca kerri,* whitefly, *Bemisia tabaci*, tobacco caterpillar, *Spodoptera litura*, semilooper, *Trichoplusia ni* and Bihar hairy caterpillar, *Spilosoma obliqua*. Kumar et al. (2007) reported seven pests with *B. tabaci* and *S. litura* being major pests.

ACKNOWLEDGEMENTS

The authors acknowledge the farmer for providing the field, and the assistance of the Zoological Survey of India, Hemiptera section, Kolkata for identifications.

REFERENCES

Agri Vision 2025. 2000. Government of Assam, Department of Agriculture and Horticulture, https://agri-horti,assam.gov.in

Chhabra K S. 1992. Advances in management of insect pests of *Vigna* species. J N Sachan (ed.), Proceedings, National symposium on new frontiers in pulses research and development(pp. 178-186), Kanpur: Directorate of Pulses Research.

Chandra U, Rajak D C. 2004. Studies on insect pests on urd bean (*Vigna mungo*). Annals of Plant Protection Sciences 12(1): 213-214.

Faiz A, Ahmed R. 2018. Incidence of Insect pests on Black gram, Journal of Emerging Technologies and Innovative Research, 5(7), p-266-271.

Jat S K, Lekha, Rana B S. 2017. Effect of abiotic factors on the incidence of major insect pests of black gram (Vigna *mungo* (L). Hepper). International Journal of Agricultural Sciences, Vol. 9, Issue.17, pp. 4159-4161.

Kumar M, Singh P S. 2016. Population dynamics of major insect pest of black gram (*Vigna mungo* L. Hepper) in relation to weather parameters. Indian Journal of Agriculture, Environment and Biotechnology, 9 (4): 673-677.

Southwood T R E, Handerson P A. 2000. Ecological methods, 3rd edition. Blackwell Publishing, Oxford, UK.

Thakur N S A, Firake D M. 2015. Insect pest of pulses in north eastern Himalaya and rationale for their management, Krishi Sewa, Agriculture Information Hub. ICAR Research Complex for NEH region, Umiam, Meghalaya.

Vikrant, Swaminathan R, Bajpai N K.2013. Population dynamics of major insect pests of black gram. Indian Journal of Applied Entomology 27(1): 16-20.

Yadav S K, Meena A, Bisht R S. 2015. Seasonal incidence of insect-pests of black gram, *Vigna mungo* (Linn.) and its correlation with abiotic factors. Agriculture Sciences Digest 35(2): 146-148.

(Manuscript Received: August, 2019; Revised: November, 2019;
Accepted: November, 2019; Online Published: November, 2019)