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Insect population associated with black gram and the influence of abiotic factors on the occurrence of insect pests affecting black gram

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Abstract
The present studies were conducted at Research Farm, College of Agriculture, Gwalior during kharif season of 2018-19. The activity of aphid, jassid and whitefly started from 34th SMW and continued till the harvest of the crop with its peak population (22.3, 4.2 and 9.0 insects/3compound leaves/plant) in 38th, 39th and 39th SMW, respectively. The activity of coreid bug and flea beetle was started from 37th SMW with its peak population (2.9 and 3.2 insects/plant) in 39th and 40th SMW. The incidence of Coccinellid beetle was started from 35th SMW till the harvest of the crop with its peak abundance (1.9 beetles/plant) in 41th SMW. Correlation studies indicated population of aphid, jassid, whitefly, coreid bug, flea beetle and Coccinella beetle on black gram significantly positive correlated with maximum temperature and evaporation. The aphid and whitefly population positively correlated with minimum temperature. There was no relationship between the observed insect fauna on black gram with humidity and rainfall.

Keywords: Aphid, peak, Coccinella

Introduction
Pulses, the food legumes have been grown by farmers since millennia providing nutritionally balanced food to the people of India and many other countries in the world (Nene, 2006) [1] and pulses are popularly known as "Poor man's meat" and "rich man's vegetable". India is major pulses growing country in the world and Madhya Pradesh is largest producer state.
The major pulse crops that have been domesticated and are under cultivation include kharif pulses like green gram, black gram, red gram, cow pea and Rabi pulses like lentil, chickpea, pea etc. Among the pulses Chickpea, Pigeon pea, Mungbean, Urdbean, Lentil and Field pea are the important crops which are widely cultivated at national & global level. Pulses are the major source of protein in the vegetarian diet in our country, besides being a rich source of protein, they maintain soil fertility through biological nitrogen fixation in soil and thus play a vital role in furthering sustainable agriculture.

Methods and Materials
The present studies were conducted at Research Farm, College of Agriculture, Gwalior during kharif season of 2018-19. Shikhar-3 variety of black gram were sown on 9 August 2018 in a plot size of 9.0 m X 10.0 m with spacing of 30 m X 10 m. Fertilizer dose for each crop was given @ 20 kg N + 50 kg P_2O_5/ha. Normal agronomical practices were followed for raising the crop successfully.

Results
The activity of aphid, jassid and whitefly started from 34th SMW and continued till the harvest of the crop with its peak population (22.3, 4.2 and 9.0 insects/3compound leaves/plant) in 38th, 39th and 39th SMW, respectively. Jat *et al.*, (2017) [2] reported aphid population attained its peak population on 2nd week of September (37th) SMW. Mahapatra *et al.*, (2018) [3] also reported that jassid and whitefly attained its peak population in 39th SMW. The activity of coreid bug and flea beetle was started from 37th SMW with its peak population (2.9 and 3.2 insects/plant) in 39th and 40th SMW. The incidence of Coccinellid beetle was started from 35th SMW till the harvest of the crop with its peak abundance (1.9

beetles/plant) in 41^{th} SMW. Mahapatra *et al*., (2018) [3] reported peak population of coccinellid beetle was observed in the 41^{th} SMW. Correlation studies indicated population of aphid, jassid, whitefly, coreid bug, flea beetle and Coccinella beetle on black gram significantly positive correlated with maximum temperature and evaporation. Kataria and Kumar (2016) [4] reported aphid population showed positive correlation with high temperature. Beeraganni (2012) [5] reported correlation of aphid found positive and significant with evaporation. Rakhshan *et al*., (2018) [6] also reported aphids and predators interaction greatly influenced by environmental condition such as temperature. Sujata and Bharpoda (2017) [7] reported jassids population showed significant positive correlation with maximum temperature. Chandra *et al*., (2010) [8] reported population of whitefly were positively correlated with maximum temperature. Kumar *et al*., (2007) [9] also reported population of whitefly significantly correlated with maximum temperature. Nayak *et al*., (2004) [10] reported high mean ambient temperature favored pest population build-up. The aphid and whitefly population positively correlated with minimum temperature. Chandra *et al*., (2010) [8] reported that population of whitefly positively correlated with minimum temperature.

There was no relationship between the observed insect fauna on black gram with humidity and rainfall.

Table 1: Succession and incidence of insect fauna on Black Gram at different meteorological week during kharif- 2018-19

SMW	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)	Evaporation (mm)	Population of sucking insect pests on 3 compound leaves/plant			Insect fauna population/plant		
	Max.	Min.	Morn.	Even.			Aphid	Jassid	Whitefly	Flea beetle	Coreid bug	Coccinellid beetle
34	31.6	25.73	90.71	78.57	82.00	2.06	0.4	0.2	0.5	-	-	-
35	30.53	24.94	92.86	82.71	84.40	2.03	0.4	0.4	0.9	-	-	0.2
36	28.89	23.79	91.43	81.43	50.80	0.94	6.6	0.8	4.1	-	-	0.7
37	31.76	24.61	79.86	67.43	0.00	5.00	14	1.5	5.7	0.2	0.3	1
38	34.6	23.76	83.00	66.86	5.89	5.43	22.3	2.5	8.7	2	1.6	1.7
39	33.79	22.11	80.14	56.86	0.00	4.91	18.8	4.1	9	3.0	2.9	1.5
40	36.76	21.10	79.57	44.14	0.00	6.03	9.8	4.2	6.8	3.2	2.8	1.6
41	35.41	18.70	81.57	38.57	0.00	5.29	6	3.6	5.7	2.5	2.2	1.9
42	36.5	17.43	76.86	27.57	0.00	5.17	2.6	0.8	0.7	1.1	0.4	1
43	34.56	14.97	80.71	28.71	0.00	4.29	0.8	0.6	0.4	0.2	-	0.5

Table 2: Correlation coefficient of insect fauna of Black Gram

Abiotic factor	Aphid	Jassid	White fly	Flea beetle	Coreid bug	Coccinellid beetle
Coefficient of correlation (r) for population and atm. max. temperature	0.16*	0.55*	0.20*	0.69*	0.59*	0.65*
Coefficient of correlation (r) for population and atm. min. temperature	O.27*	-0.11	0.22*	-0.22	-0.12	-0.24
Coefficient of correlation (r) for population and relative humidity morning	-0.37	-0.52	-0.35	-0.57	-0.49	-0.64
Coefficient of correlation (r) for population and relative humidity evening	0.12	-0.20	-0.06	-0.41	-0.31	-0.43
Coefficient of correlation (r) for population and total rainfall	-0.51	-0.61	-0.52	-0.61	-0.55	-0.76
Coefficient of correlation (r) for population and total evaporation	0.50*	0.68*	0.52*	0.72*	0.59*	0.79*

Conclusion

Pulses play a crucial role in both human nutrition and sustainable agriculture due to their high protein content and ability to enhance soil fertility through nitrogen fixation. The study conducted on black gram revealed that the population dynamics of aphids, jassids, whiteflies, coreid bugs, flea beetles, and coccinellid beetles were significantly influenced by environmental factors such as temperature and evaporation. These findings align with previous research, confirming that higher temperatures positively correlate with the population growth of these pests. Understanding these correlations is essential for improving pest management strategies in pulse crops, ultimately supporting agricultural productivity and sustainability.

Reference

1. Nene YL. Indian pulses through the millennia. Asian Agri-History. 2006;10:179-202.
2. Jat SK, Lekha, Rana BS. Effect of abiotic factors on the incidence of major insect pests of blackgram [*Vigna mungo* L. Hepper]. International Journal of Agriculture Sciences. 2017;9(17):4159-4161.
3. Mohapatra M, Singh DC, Gupta PK, Chandra U, Patro B, Mohapatra SD. Seasonal incidence of major insect-pests on blackgram, *Vigna mungo* (Linn.) and its correlation with weather parameters. International Journal of Current Microbiology and Applied Sciences. 2018;7(06):3886-3890.
4. Kataria R, Kumar D. Population dynamics of *Aphis craccivora* (Koch) and its natural enemies on bean crop in relation to weather parameters in Vadodara, Gujarat, India. Legume Research. 2017;40(3):571-579.
5. Beeraganni KM. Population dynamics and chemical control of insect pests of mung bean [*Vigna radiata* (L.) Wilczek] [M.Sc. thesis]. Agricultural Entomology Department, N. M. College of Agriculture, Gujarat; 2012.
6. Rakhshan, Ahmad ME, Kumar S. Seasonal incidence of *Aphis craccivora* Koch on *Vigna mungo* and *Vigna radiata* with its predator *Cheilomenes sexmaculata* (Fabricius) (Coleoptera: Coccinellidae). Advances in Agricultural Science. 2018;6(01):26-33.
7. Sujatha B, Bharpoda TM. Succession of major insect pests and impact of abiotic factors in green gram. Agric. Update. 2017;12(Techsear-10):2788-2794.
8. Chandra U, Singh K, Singh HM, Kumar R. Incidence of flower feeders and tissue borers on urd bean (*Vigna mungo* L. Hepper) and their correlation with abiotic factors. International Journal of Plant Protection. 2010;3(2):242-244.
9. Kumar R, Ali S, Chandra U. Seasonal incidence of *Vigna mungo* and its correlation with abiotic factors.

Annals of Plant Protection Sciences. 2007;15(2):366-369.
10. Nayak SK, Ram U, Chhibber RC. Effect of abiotic factors on the insect population buildup on black gram, *Vigna mungo* L. crop. Life, Earth and Health Science. 2004;11(1):31-36.