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Ashish Pal
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

DV Singh
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

Rajendra Prasad
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

Vikrant
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

Pankaj Kumar
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

Akash Singh
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

Ashutosh Pal
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

Shivendra Kumar Yadav
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

Corresponding Author:
DV Singh
 Department of Entomology, Sardar
 Vallabhbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar
 Pradesh, India

Assessment of the insect pest complex associated with black gram *Vigna mungo* L. (Hepper) in Western Uttar Pradesh

Ashish Pal, DV Singh, Rajendra Prasad, Vikrant, Pankaj Kumar, Akash Singh, Ashutosh Pal and Shivendra Kumar Yadav

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Abstract

A field experiment was conducted during the *kharif* season of 2022 at the Crop Research Centre, Sardar Vallabhbhai Patel University of Agriculture and Technology (SVPUA&T), Modipuram, Meerut, Uttar Pradesh, to document the insect pest complex of black gram (*Vigna mungo* (L.) Hepper) under the agro-climatic conditions of western Uttar Pradesh. The black gram variety PU-31 was grown following recommended agronomic practices, and insect pests were monitored weekly from 10 days after germination until crop maturity using randomly tagged plants. A total of 12 insect pest species belonging to four orders and ten families were recorded. Hemiptera was the dominant order with five species, followed by Lepidoptera with five species, while Orthoptera and Coleoptera were represented by one species each. The major sucking pests were *Bemisia tabaci*, *Empoasca kerri*, *Aphis craccivora*, *Nezara viridula* and *Riptortus pedestris*, whereas *Spodoptera litura*, *Spilosoma obliqua*, *Maruca vitrata*, *Helicoverpa armigera*, *Lampides boeticus*, *Chrotogonus trachypterus* and *Mylabris phalerata* were recorded as important defoliators and pod feeders. Sucking pests predominated during the vegetative stage, while pod-feeding insects were mainly observed during the flowering and pod development stages. The study provides baseline information on the insect pest complex of black gram, which will be valuable for pest surveillance and the development of location-specific integrated pest management strategies in western Uttar Pradesh.

Keywords: Black gram, *Vigna mungo*, insect pest complex, pest diversity, western Uttar Pradesh

Introduction

Black gram (*Vigna mungo* (L.) Hepper), commonly known as urd bean, is one of the most important pulse crops cultivated during the *kharif* season in India. It is valued for its high nutritional content, containing approximately 24% Protein, Carbohydrate (59.6%), Fat (1.4%), Mineral (3.2%), Fibre (0.9%) and plays a significant role in improving soil fertility through biological nitrogen fixation (Tiwari and Shivhare, 2016) [10]. The crop is widely grown under diverse cropping systems due to its short duration and adaptability. India is the world's largest user and producer of black gram. Approximately 15.7% of all pulses produced in India are black grams. Madhya Pradesh, Rajasthan, Uttar Pradesh, Andhra Pradesh, Maharashtra, and Tamil Nadu are the principal black gram producing states in India. Black grams are grown on 39.93 lakh ha in land India, with a productivity of 852 kg/ha and an annual yield of 20.5 lakh tonnes. In Uttar Pradesh, it occupies an area of 3.93 lakh ha. with production of 3.65 lakh tonnes, and productivity of 929 kg/ha (Anonymous, 2021) [1]. Despite its economic importance, the productivity of black gram remains below its potential because of several biotic and abiotic constraints. Among these, insect pests are one of the major factors limiting crop production, causing yield losses of up to 30% under favourable conditions (Lal and Sachan, 1987) [5]. The crop is attacked throughout its growth period by a complex of sucking and defoliating insect pests. Major sucking pests include whitefly (*Bemisia tabaci*), jassids (*Empoasca* spp.), aphid (*Aphis craccivora*), and thrips (*Caliothrips* spp.), while important defoliators include tobacco caterpillar (*Spodoptera litura*), Bihar hairy caterpillar (*Spilarctia obliqua*), leaf webber (*Grapholita critica*), leaf miner (*Chromatomyia horticola*), and grey weevil (*Myllocerus* spp.) (Kumar et al., 2007) [3].

The occurrence of these insect pests is strongly influenced by weather factors such as temperature, relative humidity and rainfall. Understanding the seasonal complex of insect pests is essential for forecasting pest outbreaks and developing effective integrated pest management (IPM) strategies (Yadav *et al.*, 2020) ^[11].

Information on the insect pest complex of black gram under the agro-climatic conditions of western Uttar Pradesh is limited. Therefore, the present study was undertaken to document the insect pest complex associated with black gram and identify the major insect pests occurring during different crop growth stages. The information generated from this study will provide baseline knowledge on the diversity and occurrence of insect pests, which will be useful for future pest surveillance, monitoring, and the development of appropriate integrated pest management strategies in black gram.

Materials and Methods

Experiment Site

The field experiment was conducted during the *Kharif* season of 2022 at the Crop Research Centre (CRC), Sardar Vallabhbhai Patel University of Agriculture and Technology (SVPUA&T), Modipuram, Meerut, Uttar Pradesh, India. The experimental site is located at 28.98° N latitude and 77.70° E longitude, at an altitude of 247 m above mean sea level (MSL).

Experimental Details

The experiment was conducted throughout the *Kharif* season (August to October) of 2022. The experimental field covered an area of 100 m², with a plot size of 10 × 10 m. The black gram variety PU-31 was sown at a spacing of 30 cm between rows and 10 cm between plants. The crop was raised following the recommended package of agronomic practices prescribed by the Indian Institute of Pulses Research (IIPR), Kanpur, including land preparation, sowing, seed treatment, fertilizer application, irrigation, weed management and other standard crop management practices.

Data Collection

The population of insect pests was monitored at weekly intervals, starting 10 days after germination (DAG) and continuing until crop maturity. Observations were recorded based on the physical presence of insect pests on the crop. For this purpose, randomly selected plants were tagged in the experimental field, and the occurrence of different insect pests was recorded through regular field observations.

Results and Discussion

The Result of insect pests associated with black gram during the *kharif* season of 2022 revealed the presence of 12 insect pest species belonging to four orders and ten families (Table 1). The recorded pest complex comprised both sucking and chewing insects infesting the crop from the vegetative to pod formation stages under the agro-climatic conditions of western Uttar Pradesh. Among the recorded species, Hemiptera was the dominant order, represented by five species: green stink bug (*Nezara viridula*), whitefly (*Bemisia tabaci*), leafhopper (*Empoasca kerri*), black aphid

(*Aphis craccivora*), and pod bug (*Riptortus pedestris*). The order Lepidoptera was represented by five species, namely tobacco caterpillar (*Spodoptera litura*), spotted pod borer (*Maruca vitrata*), gram pod borer (*Helicoverpa armigera*), blue butterfly (*Lampides boeticus*), and Bihar hairy caterpillar (*Spilosoma obliqua*). The remaining two orders, Orthoptera and Coleoptera, were represented by surface grasshopper (*Chrotogonus trachypterus*) and blister beetle (*Mylabris phalerata*), respectively.

The insect pests infested the crop at different growth stages. Sucking pests such as whitefly, leafhopper, aphid, and green stink bug were observed predominantly during the vegetative stage, where both nymphs and adults caused damage by feeding on plant sap. Defoliators, including tobacco caterpillar, Bihar hairy caterpillar, and surface grasshopper, were mainly associated with the vegetative phase and caused feeding damage to foliage. Flower- and pod-feeding insects, such as spotted pod borer, gram pod borer, blue butterfly, pod bug, and blister beetle, appeared during the reproductive stage, damaging flowers, developing pods, and seeds.

The damaging stages also varied among insect groups. Nymphs and adults were responsible for injury in most hemipteran pests, whereas larval stages caused damage in lepidopteran species. Adult blister beetles fed primarily on flowers, while both nymphs and adults of the grasshopper damaged the foliage.

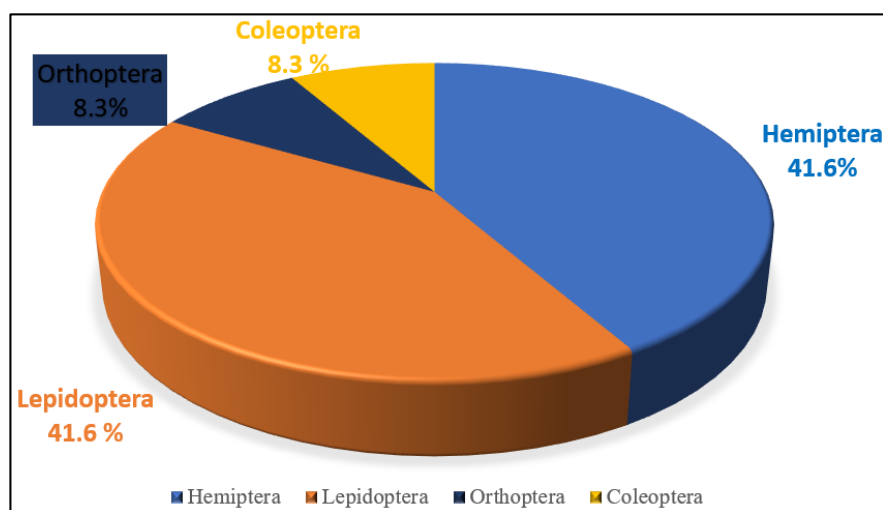
The present investigation demonstrates that black gram supports a diverse assemblage of sucking pests, defoliators, and pod feeders throughout its growth period. Knowledge of the insect pest complex and their occurrence at different crop stages provides essential baseline information for pest surveillance and forms the basis for developing effective and location-specific integrated pest management strategies for black gram under the conditions of western Uttar Pradesh.

The present findings corroborate those of Kumar (2013) ^[4], who reported 13 insect pest species associated with black gram and green gram, including *Helicoverpa armigera*, *Maruca vitrata*, *Empoasca kerri*, *Spodoptera litura*, *Lampides boeticus*, *Spilosoma obliqua*, *Bemisia tabaci*, *Aphis craccivora*, and *Mylabris* spp. The similarity in species composition indicates that these insects constitute the major pest complex of black gram under Indian agro-ecosystems. However, the occurrence of *Nezara viridula*, *Chrotogonus trachypterus* and *Riptortus pedestris* in the present study may be attributed to regional agro-climatic conditions and local cropping practices in western Uttar Pradesh.

The present observations are further supported by Mohapatra (2018) ^[6], who reported that the pod borer complex of black gram consisted of *Helicoverpa armigera*, *Maruca vitrata*, *Lampides boeticus*, *Euchrysops cnejus*, *Etiella zinckenella*, and *Apion amplum*, with *H. armigera* and *M. vitrata* being the most consistently occurring and destructive species. In the present study, *H. armigera*, *M. vitrata* and *L. boeticus* were also recorded during the flowering and pod development stages, confirming their regular association with black gram and highlighting their importance as key reproductive-stage pests.

Table 1: Insect pest complex associated with black gram (*Vigna mungo* (L.) Hepper) under the agro-climatic conditions of western Uttar Pradesh during the *kharif* season of 2022.

S. No	Common name	Scientific name	Order	Family	Damaging stage	Crop stage	Economic status
1	Green stinkbug	<i>Nezara viridula</i>	Hemiptera	Pentatomidae	Nymph and adult	Vegetative	Minor
2	Whitefly	<i>Bemisia tabaci</i> (Gennadius)	Hemiptera	Aleyrodidae	Nymph and Adult	Vegetative stage	Minor
3	Surface Grasshopper	<i>Chrotogononous trachypterus</i> (Blanchard)	Orthoptera	Acrididae	Nymph and Adult	Vegetative and young pods stage	Minor
4	Leafhopper	<i>Empoasca kerri</i> (Pruthi)	Hemiptera	Cicadellidae	Nymph and Adult	Vegetative stage	Major
5	Black aphid	<i>Aphis craccivora</i> (Koch)	Hemiptera	Aphididae	Nymph and adult	Vegetative and young pods stage	Minor
6	Tobacco caterpillar	<i>Spodoptera litura</i> (Fabricus)	Lepidoptera	Noctuidae	Larva	Vegetative stage and pod formation	Minor
7	Pod bug	<i>Riptortus pedestris</i>	Hemiptera	Coreidae	Nymph and adult	Vegetative stage and podding	Minor
8	Spotted pod borer	<i>Maruca vitrata</i> (Geyer)	Lepidoptera	Crambidae	Larva	Flowering and pod formation	Major
9	Gram pod borer	<i>Helicoverpa armigera</i> (Hubner)	Lepidoptera	Noctuidae	Larva	Flowering and podding	Major
10	Blue butterfly	<i>Lampides boeticus</i> (Linn.)	Lepidoptera	Lycaenidae	Larva	Flowering and podding	Minor
11	Bihar hairy caterpillar	<i>Spilosoma obliqua</i> (Walker)	Lepidoptera	Arctiidae	Larva	Vegetative and podding	Major
12	Blister beetle	<i>Mylabris phalerata</i> (Thunberg)	Coleoptera	Meloidae	Adult	Flowering stage	Minor



Percent of order wise insect infestation

References

- Anonymous. Directorate of Economics & Statistics, Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India. Indian Farming. 2021;37(7):29-32.
- Kumar M, Singh PS. Seasonal incidence of major insect pests of black gram *Vigna mungo* (L.) Hepper in relation to environmental factors. Journal of Experimental Zoology India. 2016;19(2):831-834.
- Kumar R, Ali S, Chandra U. Seasonal incidence of insect pests on *Vigna mungo* and its correlation with abiotic factors. Annals of Plant Protection Sciences. 2007;15(2):366-369.
- Kumar S. Evaluation of bio-efficacy of novel insecticide against *Helicoverpa* (Hübner) in black gram *Vigna mungo* L. M.Sc. Thesis. Meerut: Sardar Vallabhbhai Patel University of Agriculture and Technology; 2013. p. 1-63.
- Lal SS, Sachan JN. Recent advances in pest management in pulses. Indian Farming. 1987;37(7):29-32.
- Mohapatra MM, Singh DC, Gupta PK, Chandra U, Patro B, Mohapatra SD, *et al.* Seasonal incidence of major insect pests on black gram *Vigna mungo* (L.) and its correlation with weather parameters. International Journal of Current Microbiology and Applied Sciences. 2018;7(6):3886-3890.
- Nayak SK, Chhibber RC, Ujagir R. Pest complex and their succession on black gram *Vigna mungo* L. Shashpa. 2005;12(1):60-62.
- Parmar SG, Naik MM, Pandiya HV. Bio-efficacy of some insecticides against pest complex of black gram *Vigna mungo* L. International Journal of Plant Protection. 2015;8(1):162-168.
- Radhika M, Reddy NC, Anitha V, Vidhyasagar B, Ramesh S. Efficacy of insecticides against sucking pest complex in black gram. International Journal of Chemical Studies. 2018;6(5):1793-1797.
- Tiwari AK, Shivhare AK. Pulses in India: Retrospect and Prospects. Bhopal: Directorate of Pulses Development, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India; 2016.
- Yadav A, Singh G, Singh H, Singh DV, Khilari K, *et al.* Black gram is related with a complex of insect pests in western Uttar Pradesh. Journal of Entomology and Zoology Studies. 2020;8(5):82-86.