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MONITORING INSECT PEST COMPLEX ON BLACK GRAM

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ABSTRACT

The pest spectra, comprising of thirteen species, were observed to attack black gram at different stages of crop growth. The stem fly *Ophiomyia phaseoli* (Tryon), whitefly, *Bemisia tabaci* (Gennadius), black aphid *Aphis craccivora* (Koch), pod bug *Riptortus pedestris* (F), surface grasshopper, *Chrotogonus trachypterous* (Blanchard), semilooper, *Plusia orichalcea* (F), tobacco caterpillar, *Spodoptera litura* (F), blue butterfly *Lampides boeticus* (L) and blister beetle *Mylabris pustulata* (Thunberg) have assumed the status of minor pests whereas, gram pod borer *Helicoverpa armigera* (Hubner), spotted pod borer *Maruca vitrata* (Geyer), Bihar hairy caterpillar *Spilosoma obliqua* (Walker) and leafhopper *Empoasca kerri* (Pruthi) were recorded as major pests.

Key words: Black gram, blister beetle, Lepidoptera, pest spectra, pod bug, spotted pod borer, stem fly, surface grasshopper, whitefly

Black gram (*Vigna mungo*) is an important pulse crop (Pandey et al., 2019) due to its nutritional and industrial values (Nene, 2006). The major black gram producing states in India are Madhya Pradesh, Rajasthan, Uttar Pradesh, Andhra Pradesh, Maharashtra and Tamil Nadu**.** In India, black gram is grown on 45.33 lakh ha with an annual production of 20.81 lakh and productivity of 459 kg ha^{-1}. In Uttar Pradesh, it occupies an area of 5.64 lakh ha^{-1} with production of 2.45 lakh tonnes, and productivity of 434 kg ha^{-1} (Anonymous, 2020). Many abiotic and biotic factors limit the productivity of black gram. Among these insect pests are the main constraints. It is damaged by an array of insect pests from sowing to harvest in the field as well as in the harvested produce in storage. In India, 60 insect species are known to attack black gram crop (Anonymous, 2008). The losses due to pest complex ranged from 25.9 to 67.8% (Justin et al., 2015). Hence, there is a update the insect-pest complex of black gram.

MATERIALS AND METHODS

In order to study the pest complex, a field experiment was conducted at the Crop Research Centre, Chirodi of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut during kharif, 2018 and 2019. The variety 'Pant Urd-31' was sown manually 5-7 cm deep on 18 August, 2018 for the first year experiment and on 20 August, 2019 for the second year experiment with row to row and plant to plant spacing of 30 x 10 cm, respectively. The insect pests associated were recorded right from germination till harvest at weekly intervals. Observations were recorded on 10 randomly selected tagged plants. The insects were collected and reared up to adult stage whenever necessary. Adult insects were preserved and identified. The nature and extent of damage caused were also recorded to assess the economic status. Incidence of sucking pests was recorded on three leaves/ ten plants (top, middle and bottom). Observations on pod borers and remaining all other insect-pests were recorded on plant parts from 10 randomly selected plants. The insect pests which occurred consistently and causing appreciable damage were categorized as major insect pests. Those insects appeared for a short period or in fairly low numbers were categorized as minor insect pests.

RESULTS AND DISCUSSION

Thirteen species were recorded during the cropping season at different stages of black gram in an overlapping manner (2018 and 2019). The results revealed that the maximum number of insect pests (6 species) belonged to the order Lepidoptera followed by Hemiptera (4 species), whereas, Orthoptera, Diptera and Coleoptera contributed to only one species of the infestation. Two natural enemies which played vital role in minimizing the insect pests population were also recorded. The lepidopterans included *Helicoverpa armigera* (Hubner), from flowering to pod formation stage and continued till the maturity of the crop; spotted pod borer*, Maruca vitrata* (Geyer) seen as a major pest;

Bihar hairy caterpillar, *Spilosoma obliqua* (Walker) from vegetative to pod maturity stage; semilooper, *Plusia orichalcea* (F.) was active from vegetative to pod maturity stage; tobacco caterpillar, *Spodoptera litura* (F.) was observed as minor insect pest from vegetative to pod maturity stage; blue butterfly, *Lampides boeticus* (L.) was noticed in the field for short duration from flowering to pod formation. Other pests includes leaf/ hopper, *Empoasca kerri* (Pruthi) which appeared in the vegetative phase as a major pest; whitefly, *Bemisia tabaci* (Gennadius) as a minor pest; black aphid, *Aphis craccivora* (Koch) found less in number as a minor pest; pod bug, *Riptortus pedestris* (F) as a a minor pest from pod filling to maturity stage; orthopteran like surface grasshopper, *Chrotogonus trachypterous* (Blanchard) in the vegetative stage as minor pest; dipteran like stem fly, *Ophiomyia phaseoli* (Tryon) first appearing after two weeks of germination; coleopteran like blister beetle, *Mylabris pustulata* (Thunberg) noticed in mid-September as minor pest. Natural enemies observed includes ladybird beetle *Coccinella septempunctata* and spider predatory on *A. craccivora*, *E. kerri* and various sucking pests (Table 1).

The present findings are in agreement with earlier reports. The present findings are also in confirmation with the findings of (Kumar and Mehto, 1996) who reported that the pod borer complex includes *H. armigera*, *M. vitrata*, *L. boeticus*, *Euchrysops cnezus* (F.), *Etiella zinckenella* (Treitschke) and *Apion ampulum* (Faust) regular in occurrence; among them *H. armigera* and *M. vitrata* were the major pests and play an important role in decreasing the crop yield. Yadav and Patel (2016) reported that among thirteen insect species recorded four were foliage feeders, five were sap suckers, three were flower/pod feeders and one was stem feeder on black gram. Kumar (2017) recorded 16 species of insect pests in all stages of the black gram; *S. obliqua*, *S. litura,* and *E. kerri* were recorded as serious; *H. armigera* and *M. vitrata* were recorded as major pests. Nair et al. (2018) observed 64 insect pests in all stages of the pigeon pea. Mohapatra et al. (2019) monitored insect-pest complexes on black gram and reported that *E. kerri, S. obliqua* and *S. litura* were major insect pests. Ojha et al. (2022) reported *B. tabaci*, *A. craccivora*, *E. kerri* and thrips *Thrips tabaci* Lindeman along with *M. vitrata* on mung bean. Dash

Table 1. Insects pest complex associated with black gram (kharif, 2018 & 2019)

S.No.	Common name	Scientific name	Order	Family	Plant part affected	Crop stage	Economic status
1	Gram pod borer	*Helicoverpa armigera* (Hubner)	Lepidoptera	Noctuidae	Leaves, pods	Flowering and podding	Major
2.	Spotted pod borer	*Maruca vitrata* (Geyer)	Lepidoptera	Pyralidae	Flowers, pods	Vegetative stage and pod formation	Major
3.	Bihar hairy caterpillar	*Spilosoma obliqua* (Walker)	Lepidoptera	Arctidae	Leaves	Vegetative and reproductive stage	Major
4.	Semilooper	*Plusia orichalcea* (F)	Lepidoptera	Noctuidae	Leaves	Vegetative stage	Minor
5.	Tobacco caterpillar	*Spodoptera litura* (F)	Lepidoptera	Noctuidae	Leaves	Vegetative stage and pod formation	Minor
6.	Blue butterfly	*Lampides boeticus* (L)	Lepidoptera	Lycaenidae	Flower buds	Flowering and podding	Minor
7.	Whitefly	*Bemisia tabaci* (Gennadius)	Hemiptera	Aleurodidae	Sap sucker on leaves	Vegetative stage	Minor
8.	Leafhopper	*Empoasca kerri* (Pruthi)	Hemiptera	Cicadellidae	Sap sucker on leaves	Vegetative stage	Major
9.	Black aphid	*Aphis craccivora* (Koch)	Hemiptera	Aphididae	Sap sucker on leaves, shoot	Vegetative and young pods stage	Minor
10	Pod bug	*Riptortus pedestris* (F)	Hemiptera	Coreidae	Sap sucker on pods	Pod filling to maturity	Minor
11	Surface grass hopper	*Chrotogonus trachypterous* (Blanchard)	Orthoptera	Acrididae	Leaves	Vegetative and young pods stage	Minor
12	Stem fly	*Ophiomyia phaseoli* (Tryon)	Diptera	Agromyzidae	Stem	Seedling and vegetative	Minor
13	Blister beetle	*Mylabris pustulata* (Thunberg)	Coleoptera	Meloidae	Flower, pod, leaves	Flowering stage	Minor

et al. (2023) observed ten species of insect pest attacking black gram.

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AUTHOR CONTRIBUTION STATEMENT

AY and GS designed research, conducted field experiment and analyzed the data. TY assisted in writing and reviewing the manuscript.

CONFLICT OF INTEREST

No conflict of interest.

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