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Screening of mungbean (*Vigna radiata* L.) germplasm against major sucking pest

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Abstract
A field experiment was conducted to screening the mungbean germplasm against sucking pests. The data revealed that the population of whitefly ranged from 3.66 to 23.30/cage. The maximum white fly population was recorded in genotype RMG-1092 (23.30 white fly/cage) followed by AKM 12-14 and GAM-5(13.66 whitefly/cage) and minimum (3.66 whitefly/cage) in genotype MDGVV-16. However, the population of jassid was ranged between 7.33 to 30.00/cage. The maximum jassid population was recorded in genotype VGG 10-008 (30.00 jassid/cage), followed by COGG-912 (28.00 jassid/cage) and minimum (7.33 jassid/cage) in genotype PUSA-1672. The population of thrips ranged from 3.80 to 8.80 per five plants. The maximum population of thrips was recorded in genotype IGKM 06-26-5(8.80 thrips/5 plants) followed by NKM 15-12 (8.70 thrips/5 plants). While the minimum population of thrips was observed in NBPGR-150 (3.80 thrips/5 plants).

Keywords: Mungbean, germplams, white fly, jassid, thrips.

Introduction
Pulses, the food legumes, have been grown by farmers since millennia providing nutritionally balanced food to the people of India [1] and many other countries in the world.*Vigna radiata* (L.) Wilczek [Synonyms: *Phaseolus radiatus* L. (1753), *Phaseolus aureus* Roxb. (1832)], often known as green gram/mungbean, is native to India and central Asia. It has been grown in these regions since prehistoric times [2] and as an important legume crop in India throughout the year. It is short day plant. An annual rainfall of 600-700 cm is sufficient for crop growth. Optimum temperature requirement is 28-30 ^{0}C. It is cultivated on a wide range of soils from sandy loams to black cotton soil. Optimum pH of soil for green gram is 6.5-7.5. It can tolerate soil salinity to some extent. Mungbean is third most important pulse crop of India after chickpea and pigeon pea. It is relished for easy digestibility as dal or split seeds and green pods are used as vegetables. The seeds are said to be a traditional source of cures for paralysis, rheumatism, coughs, fevers and liver ailments [3] Being an important short-duration *Kharif* grain legume, mungbean is grown extensively in major tropical and sub-tropical countries of the world. It is cultivated in India, Myanmar, Pakistan, Thailand, Sri Lanka, Indo-China, Indonesia and China. In India, it is cultivated in Andhra Pradesh, Orissa, Madhya Pradesh, Maharashtra, Bihar and Gujarat. In India, the area under mungbean was 3.83 mha. with production 1.60 million tonnes and productivity 418 kg/ha. In Uttar Pradesh, the area under mungbean was 51000 ha. with production 33000 tonnes and productivity 666 kg/ha [4].
It has been reported that sixteen species of insect-pests cause damage to mungbean *viz.*, legume pod borer (*Maruca vitrata*), gram pod borer (*Helicoverpa armigera*), white fly (*Bemisia tabaci*), jassid (*Amrasca biguttula biguttula*), thrips (*Megalurothrips distalis*), bihar hairy caterpillar (*Spilarctia obliqua*), tobacco caterpillar (*Spodoptera litura*), and stem fly (*Ophiomyia phaseoli*) [5]. Among sucking pests, whitefly *Bemisia tabaci* (Aleyrodidae: Homoptera) is a serious pest. Both nymphs and adults suck the sap from under surface of leaves which result in chlorotic spots and also pre-maturely dropping of leaves. It also leads to development of souty mould on leaves that interfere with photosynthetic activity [6]. It also acts as a vector of Mungbean Yellow Mosaic Virus (MYMV). Jassid, *Amrasca biguttula biguttula* (Cicadellidae: Homoptera) is an alarming pest throughout the crop growth. Nymphs and adults of jassid desap the leaves which results in a characteristic symptom known as "hopper burn". Thrips are small, slender insects that are less than 2 mm long. Pest status is moderate, widespread and regular. Crops are at greatest risk during flowering and pod set. Nymphs and adults feed on growing points and inside the flowers which can result in flower abortion and pod distortion.

Materials and Methods

The experiment was laid out at Student's Instructional Farm of Narendra Deva University of Agriculture and Technology, Kumarganj, Fiazabad. A test entries of 50 germplasms including two checks SML 1811 (resistant) and ML 623 (susceptible) were sown in RBD with 3 replications for screening sucking pests under field conditions on 31st July, 2017. Each genotype was assigned two rows of 2 m length at 30 cm spacing. The observations of white fly and jassid population were recorded on 5 randomly selected plants at weekly intervals starting with 20 days after sowing (DAS) till harvest by using rectangular cage (45 cm long, 30 cm wide and 90 cm high), between 5:00 to 7:00 AM. Thrips population was recorded at weekly intervals on 5 randomly selected plants starting with 50% flowering till harvest in terms of number/plants.

Result and Discussion

Whitefly

In the field screening of 50 mungbean genotypes, the white fly population ranged from 3.66- 23.30 white fly/cage (Table 1 and fig. 1). Further, data revealed that the maximum white fly population was recorded in germplasm RMG-1092 (23.30 white fly/cage) followed by AKM 12-14 and GAM-5 (13.66 white fly/cage), Pant M-6 (13.33 white fly/cage), PM 11-25 (12.66 white fly/cage) and LGG 450 (11.66 white fly/cage). However, the minimum population was recorded in MDGVV-16 and GM 11-02 (3.66 white fly/cage), followed by TMB 1343 (4.00 white fly/cage), ML 2410 and IPM 312-9 (4.33 white fly/cage). All these germplasm are compare with to check germplasm SML 1811 (resistance) and ML 623 (susceptible) with the population 7.00 and 11.00 white fly/cage, respectively.

Table 1: Screening of mungbean germplasm against major sucking pest during kharif 2017

Sl No.	Genotypes	Mean population of the sucking pests		
		White fly/cage	Jassid/cage	Thrips/ 5 plants
1.	Pant M 4	9.66	13.66	8.00
2.	ML 2410	4.33	16.66	6.60
3.	VGG 15-030	6.00	22.00	6.50
4.	KM 2349	6.66	12.33	6.60
5.	ML 818	10.00	20.00	7.00
6.	Pusa 1671	9.66	16.66	7.50
7.	Pusa 1672	8.00	7.33	4.20
8.	Pant M 6	13.33	14.33	6.20
9.	PM 11-26	7.00	19.00	7.00
10.	GM 11-02	3.66	17.33	6.50
11.	COGG 912	5.00	28.00	6.00
12.	RMG 1092	23.30	23.00	8.20
13.	PM 11-25	12.66	16.66	6.20
14.	AKM 12-24	9.66	21.00	4.20
15.	IGKM 06.26.5	5.33	21.33	8.80
16.	RMG 1087	8.66	19.00	7.60
17.	VGG 10-008	4.66	30.00	8.60
18.	IGKM 05-18-2	6.33	25.00	5.40
19.	AKM 12-14	13.66	11.33	5.70
20.	NKM 15-12	9.66	15.00	8.70
21.	Samrat	7.60	27.33	7.20
22.	VGG-118	10.66	23.66	5.80
23.	K 851	8.33	21.00	6.10
24.	IPM 99-125	10.33	26.33	7.10
25.	LGG 460	11.33	22.00	6.80
26.	MH 1142	5.66	15.00	5.20
27.	NBPGR 150	5.66	11.66	3.80
28.	IPM 2-14	11.66	15.66	5.10
29.	IPM 312-20	10.30	15.66	6.20
30.	IPM 02-3	5.00	8.00	5.40
31.	IPM 312-19	10.00	21.33	4.80
32.	ML 2412	6.00	16.66	5.30
33.	COGG 13-19	6.00	13.00	5.20
34.	TMB 134	4.00	18.33	4.40
35.	NVL 825	6.33	26.00	4.20
36.	SKNM 12-06	11.33	11.00	7.30
37.	IPM 312-9	4.33	25.00	5.80
38.	IPM 409-4	10.66	12.33	5.80
39.	IPM 14-7	10.00	23.33	5.10
40.	Pusa 672	6.00	26.00	4.90
41.	MH 2-15	7.33	17.33	4.80
42.	LGG 450	11.66	25.00	5.00
43.	NVL 516	8.33	10.33	4.20
44.	TRCM 351-2-1	7.33	17.00	5.50
45.	GAM 5	13.66	23.33	4.00
46.	NDMK 15-513	6.66	16.00	4.80
47.	KM 2241	6.00	17.00	5.00
48.	MDGVV 16	3.66	8.00	5.50
49.	SML 1811 (R)	7.00	12.00	5.22
50.	ML 623 (S)	11.00	26.33	8.87

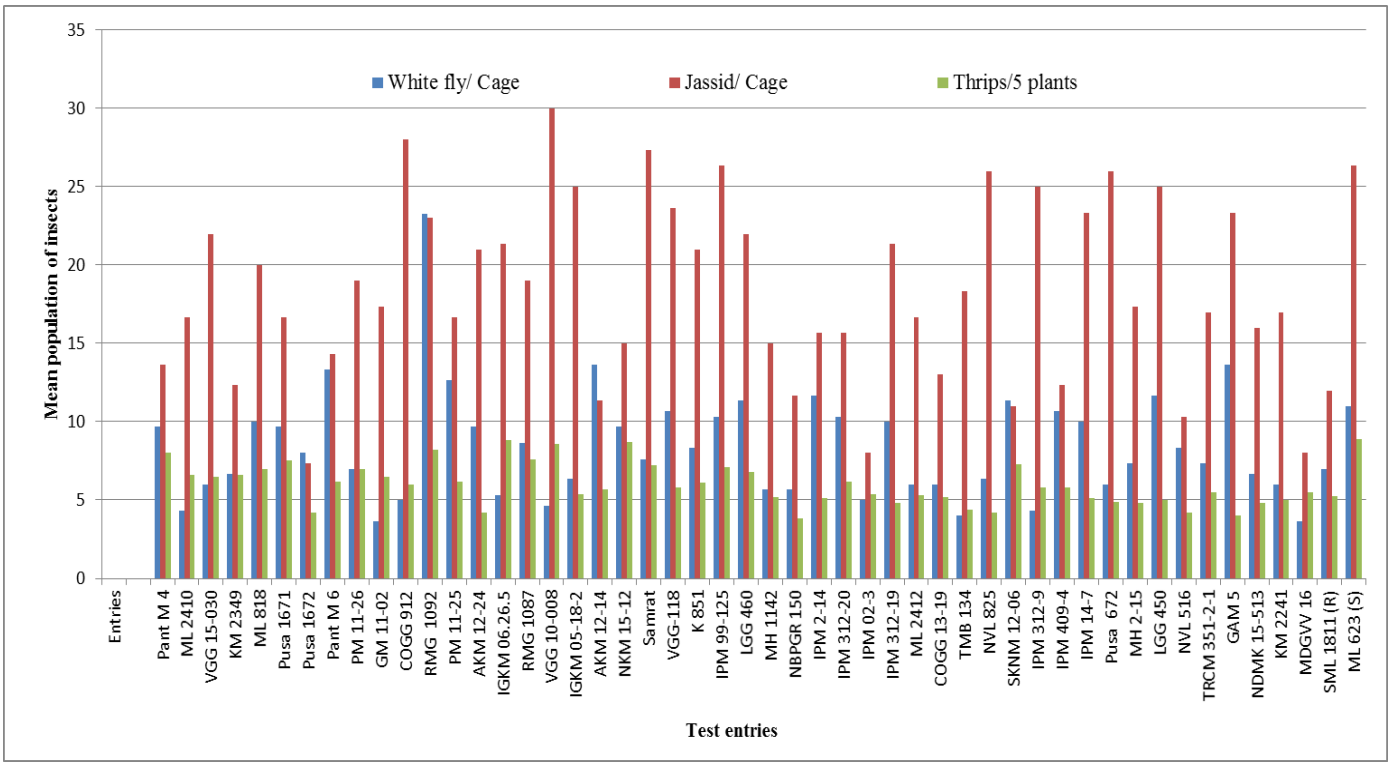

Fig 1: Population of whitefly, jassid and thrips in mungbean germplasm during Kharif 2017

Jassid

The data present in table 1 revealed that the population of jassid was varied from 7.33 - 30.00 insects/cage. The maximum jassid population was recorded in germplasm VGG 10-008 (30.00 jassid/cage) followed by COGG-912 (28.00 jassid/cage), samrat (27.33 jassid/cage), IPM 99-125 (26.33 jassid/cage), MVL 825 (26.00 jassid/cage), and pusa 672 (26.00 jassid/cage). While, the minimum population was observed in PUSA-1672 (7.33 jassid/cage), followed by IPM 02-3 (8.00 jassid/cage), MDGVV (8.00 jassid/cage), NVL 516 (10.33 jassid/cage), SKNM 12-06 (11.00 jassid/cage) and AKM 12-14 (11.33 jassid/cage). These germplasms were compare with check germplasm SML 1811 (resistant) and ML 623 (susceptible) with the population 12.00 and 26.33, respectively.

Thrips

The data of thrips population in all the mungbean germplasm was range from 3.80 to 8.80 per five plants. The maximum population of thrips was recorded in IGKM 06-26-5(8.80 thrips /5 plants), followed by NKM 15-12 (8.70 thrips/5plants), VGG 10-008 (8.60 thrips/5 plants), RMG 1092 (8.20 thrips/5 plants) and Pant M 4 (8.00 thrips/5 plants). However, the minimum population of thrips recorded in NBPGR-150 (3.80 thrips/5plants), followed by GAM 5 (4.00 thrips/5 plants), NVL 516 (4.20 thrips/5 plants), NVL 825 (4.20 thrips/5 plants), AKM 12-24 (4.20 thrips/5 plants) and Pusa 1672 (4.20 thrips/5 plants). All these germplasms are compare with SML 1811 (resistance) and ML 623 (susceptible) with the population was 5.22 and 8.87 thrips/5 plants, respectively.

The present findings are close accordance with the findings of Singh and Singh, 2014 [7] who stated that minimum population of white fly recorded ongenotype TMB-36, followed by RMG-1004 and maximum in BM-2003-2 and HUM-12. The minimum population of jassid was recorded on KM-2293 followed by TMB-36 and Pusa-1271, while maximum in BM-4, followed by ML-1628 and BM-2003-2. In case of thrips, minimum infestation was found in ML-1628, followed by Pusa-1171, ML-1464 and maximum in BPMR-145, followed by HUM-12 and Pusa-0672. Bhople *et al*., 2017 [8] also reported that the mean whitefly population was lowest on genotype, PKV GREEN GOLD (1.00 white fly/leaf) while the highest (1.90) recorded on genotype, AKM 12-14. These findings are also partial agreement with Nadeem *et al*., 2014 [9] who found the lowest no. of whitefly (3.7±1.20) in MH 1353 and highest (11±1.53) in MH 34143, lowest no. of jassid (1.2) in MH 3153 and highest of 3.3 in AZRI 2006 and the lowest no. of thrips (4±1) in MH 3153 and highest (12.3±0.67) in MH 34143 while the respective no. of these sucking pests. These results are close resemblance with Khattak *et al*., 2004 [10] who found that NM-92 and NM-98 showed significantly low mean whitefly population/leaf as compared to the other three tested varieties. Similar trend was also found among the varieties against jassids and thrips.

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