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Tarun Verma
Department of Entomology, CCS Haryana Agricultural University, Hisar, Haryana, India

Rajesh Yadav
Department of Genetic and Plant Breeding, CCS Haryana Agricultural University, Hisar, Haryana, India

Ravika
Department of Genetic and Plant Breeding, CCS Haryana Agricultural University, Hisar, Haryana, India

Corresponding Author:
Tarun Verma
Department of Entomology, CCS Haryana Agricultural University, Hisar, Haryana, India

Screening of Mungbean (*Vigna radiata* L. Wilckzek) genotypes for resistance against whitefly (*Bemisia tabaci* Gennadius) under natural infestation conditions

Tarun Verma, Rajesh Yadav and Ravika

Abstract
Thirty three Mungbean genotypes were evaluated for resistance against whitefly (*Bemisia tabaci*) during *kharif* 2018 under natural infestation conditions. Whitefly adult population ranged from 2.00 (MH 1772) to 17.22 adults/leaf (MH 1315) and 3.33 adults/leaf (MH 1142) to 14.56 adults/leaf (MH 1431) at 35 and 45 days after sowing, respectively. Maximum and minimum populations of whitefly adults were recorded at 35 days after sowing of the crop. On the basis of overall mean (35 and 45 Days after sowing) of whitefly adult population, genotypes, MH 1489, MH 1468, MH 1457, MH 1762, MH 1718, MH 1720, MH 1722, MH 1750, MH 1754, MH 1772, MH 1142, MH 1344, MH 1346 and MH 42 found promising having less than 6.0 whitefly adults/leaf.

Keywords: Mungbean, *Vigna radiata*, whitefly, *Bemisia tabaci*, screening, resistance

1. Introduction
Mungbean (*Vigna radiata* L. Wilczek) popularly known as green gram, golden gram and moong is one of the most important pulse crop grown throughout India. Mungbean being a rich source of easily digestible quality protein, minerals and vitamins, when supplemented with cereals provide a perfect mix balanced diet for a vast majority of Indian population. In India, mungbean ranks third important pulse crop after chickpea and pigeonpea occupying an area of 4.25 million hectares with annual production and productivity of 2.41 million tons and 567 kg/ha, respectively (Anonymous, 2019) [1]. Though India has distinct position in terms of pulse production but average productivity is low as compared to world. Insect-pests attack is one of the major factors limiting the productivity of this crop. Yield losses of about 30 percent (Patidar, 2015) [6], economic loss of 20-25 percent, floral damage of about 17.53 percent (Durairaj, 2001) [3] and avoidable yield losses of 32.97 percent (Duraimurugan and Tyagi, 2014) [2] have been reported in mungbean. Among insect-pests, whitefly (*Bemisia tabaci*) poses the most serious threat in northern states of India. Yield penalty of cent percent under severe condition have been reported in *Vigna* species due to whitefly (Narasimhan *et al*., 2010) [5]. Use of resistant varieties/genotypes is one of the most important practices for managing the inset-pest population in mungbean. Therefore, the present studies were conducted to evaluate the available genotypes of mungbean to identify the sources of resistance against whitefly, *B. tabaci*.

2. Materials and Methods
The present study was conducted during *kharif*, 2018 at the Research farm of Pulses Section, Chaudhary Charan Singh Agricultural University, Hisar (Haryana). Hisar is situated in semi arid, subtropical region at 29º10' N latitude and 75º46' E longitude with elevation of 215.52m above mean sea level. Thirty three mungbean genotypes including five released varieties (MH 421, MH 318, Sattya, Basanti and MH 1142) were sown in a randomized block design with three replications. All the recommended package of practices was adopted to ensure a healthy crop stand. Each genotype was sown in two rows of four meter length with 30 x10 cm spacing. The whitefly adult population was taken from three leaves (Top, middle and bottom) of three plants per replication at 35 and 45 days after sowing. The data was analyzed statistically using Analysis of variance and critical differences were calculated.

3. Results and Discussion

Whitefly adults population varied significantly among different genotypes. The population of whitefly adults ranged from 2.00 to 17.22 whitefly adults/leaf at 35 and 45 days after sowing (DAS). Minimum whitefly adults were found on genotype MH 1772 (2.00/leaf) and it was on par with MH 1762 (2.67/leaf), MH 1750 (2.78/leaf), MH 1457 (3.00/leaf), MH 1489 (3.33/leaf), MH 1468 (3.78/leaf), MH 1754 (4.56/leaf), MH 1720 and MH 318 (4.89/leaf), MH 1344 (5.00/leaf), MH 1767 (5.22/leaf), MH 1346 (5.33/leaf), MH 1740 (5.67/leaf), MH 1703 (5.78/leaf) and MH 1431 (6.00/leaf) at 35 DAS. Whereas, maximum whitefly adults were recorded on MH 1315 (17.22/leaf) and it was found at par with MH 1314 (12.78/leaf). The present findings are in partial concurrence with Khin (2019) [4] who also reported minimum population of whitefly adults were occurred on MH 318 (16.8 adults/ plant).

Data recorded on 45 DAS revealed that genotype, MH 1142 and MH 1431 harboured minimum (3.33/leaf) and maximum (14.56/leaf) whitefly adults, respectively. Genotypes, MH 1314 (9.33/leaf) and Basanti (10.78/leaf) were found at par with MH 1431. Whereas remaining genotypes were found at par with genotype, MH 1142.

On the basis of overall mean whitefly adult was minimum and maximum on genotypes, MH 1489 (3.50/leaf) and MH 1314 (11.06/leaf), respectively. Genotype, MH 1314 was found at par with MH 1315 (10.56/leaf), MH 1431 (10.28/leaf), MH 1432 (8.78/leaf), Basanti (8.72/leaf), MH 1753 (8.0/leaf), MH 1451 (7.44/leaf), Sattya and MH 1452 (7.33/leaf), MH 1129 and MH 1320 (7.22/leaf), MH 1436 and MH 1706 (7.00/leaf). Overall genotypes, MH 1489, MH 1468, MH 1457, MH 1762, MH 1718, MH 1720, MH 1722, MH 1750, MH 1754, MH 1772, MH 1142, MH 1344, MH 1346 and MH 421 were found promising against whitefly having population of less than 6.0 adults/leaf. The studies are in accordance with those of Singh *et al.* (2019) [7] who also reported less than 6.0 whitefly adults/3 leaves on genotypes, RMG 344, RMG 1051, RMG 1079, RMG 975, MUN 2, RMG 1010, MSG 118 and RMG 1076.

4. Conclusion

The present study shows that whitefly adults were less than 6.00/leaf on genotypes, MH 1489, MH 1468, MH 1457, MH 1762, MH 1718, MH 1720, MH 1722, MH 1750, MH 1754, MH 1772, MH 1344, MH 1346 and varieties MH 1142 and MH 421. Therefore these genotypes can be exploited for developing resistant varieties against whitefly.

Table 1: Evaluation of Mungbean genotypes against whitefly, *Bemisia tabaci*

S. No.	Genotypes	Whitefly adult population/ leaf		
		35 DAS	45 DAS	Mean
1.	MH 1703	5.78 (2.58)	7.00 (2.81)	6.39 (2.72)
2.	MH 1706	6.89 (2.78)	7.11 (2.84)	7.00 (2.82)
3.	MH 1718	6.00 (2.64)	5.89 (2.57)	5.94 (2.62)
4.	MH 1720	4.89 (2.42)	5.33 (2.52)	5.11 (2.47)
5.	MH 1722	6.22 (2.67)	5.44 (2.49)	5.83 (2.61)
6.	MH 1740	5.67 (2.57)	7.22 (2.83)	6.44 (2.70)
7.	MH 1750	2.78 (1.93)	5.33 (2.51)	4.06 (2.25)
8.	MH 1753	7.00 (2.81)	9.00 (3.14)	8.00 (2.98)
9.	MH 1754	4.56 (2.35)	6.11 (2.65)	5.33 (2.51)
10.	MH 1762	2.67 (1.90)	4.89 (2.41)	3.78 (2.18)
11.	MH 1767	5.22 (2.48)	7.00 (2.81)	6.11 (2.67)
12.	MH 1772	2.00 (1.73)	8.22 (3.02)	5.11 (2.46)
13.	MH 1431	6.00 (2.60)	14.56 (3.94)	10.28 (3.36)
14.	MH 1432	10.00 (3.24)	7.56 (2.87)	8.78 (3.07)
15.	MH 1436	8.56 (3.07)	5.44 (2.50)	7.00 (2.82)
16.	MH 1451	8.44 (2.97)	6.44 (2.72)	7.44 (2.86)
17.	MH 1452	6.78 (2.78)	7.89 (2.98)	7.33 (2.88)
18.	MH 1457	3.00 (1.96)	4.44 (2.26)	3.72 (2.12)
19.	MH 1468	3.78 (2.18)	3.44 (2.11)	3.61 (2.15)
20.	MH 1489	3.33 (2.08)	3.67 (2.13)	3.50 (2.12)
21.	MH 1142	7.56 (2.76)	3.33 (2.07)	5.44 (2.48)
22.	MH 1344	5.00 (2.36)	4.56 (2.32)	4.78 (2.36)
23.	MH 1346	5.33 (2.48)	5.89 (2.60)	5.61 (2.55)
24.	MH 1305	7.22 (2.87)	5.11 (2.44)	6.17 (2.68)
25.	MH 1314	12.78 (3.70)	9.33 (3.21)	11.06 (3.47)
26.	MH 1315	17.22 (4.20)	3.89 (2.20)	10.56 (3.36)
27.	MH 1320	8.78 (2.97)	5.67 (2.58)	7.22 (2.83)
28.	MH 1323	6.44 (2.69)	7.44 (2.76)	6.94 (2.80)
29.	MH 1129	6.22 (2.64)	8.22 (3.02)	7.22 (2.87)
30.	BASANTI	6.67 (2.67)	10.78 (3.33)	8.72 (3.02)
31.	MH 318	4.89 (2.35)	7.44 (2.90)	6.17 (2.67)
32.	MH 421	6.89 (2.80)	4.22 (2.26)	5.56 (2.55)
33.	SATTYA	6.44 (2.73)	8.22 (3.04)	7.33 (2.89)
C.D. at 5%		(0.93)	(0.78)	(0.66)
S.E.m±		(0.33)	(0.27)	(0.23)

DAS: Days after sowing

Values in parenthesis are square root transformation values

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