Journal BiNET
Scientific Publication

Published with Open Access at Journal BiNET
Vol. 18, Issue 01: 1478-1487
Journal of Bioscience and Agriculture Research

Journal Home: www.journalbinet.com/jbar-journal.html

Varietal Screening of Mungbean against Whitefly and Aphid

Mohammad Abdullah-Al-Rahad[1], **Md. Saidur Rahman**[2], **Tahmina Akter**[1], **Jasmin Akter**[3], **Md. Anisur Rahman**[4] **and Sheik Md. Showkat Aziz**[2]

[1]Dept. of Entomology, [2]Dept. of Agricultural Botany, [3]Dept. of Agroforestry and Environmental Science, [4]Dept. of Agronomy, Sher-e-Bangla Agricultural University, Dhaka-1207, Bangladesh.

✉ For any information: ask.author@journalbinet.com

Article received: 06.08.18; Revised: 20.10.18; First published online: 14 December 2018.

ABSTRACT

The experiment was conducted for varietal screening of mungbean against sucking insect pest whitefly (Bemisia tabaci) and aphid (Aphis gossypii). Different mungbean varieties i.e. BARI Mung-1, BARI Mung-2, BARI Mung-3, BARI Mung-4, BARI Mung-5 and BARI Mung-6 were used as treatment for this study. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications. Data on different parameter were recorded and statistically significant variation was observed for different varieties. Among the varieties, BARI Mung-6 showed the least whitefly and aphid population and highest resistance against whitefly and aphid infestations at different stages than all other varieties. The highest seed yield (1.82 t ha^{-1}) was recorded from BARI Mung-6, while the lowest (1.30 t ha^{-1}) was recorded from BARI Mung-4. It means that BARI Mung-6 were superior to other varieties in terms of lowest whitefly and aphid infestation and maximum yield.

Key Words: *Mungbean, Infestation, Resistance, Whitefly, Aphid.*

Cite Article: Abdullah-Al-Rahad, M., Rahman, M. S., Akter, T., Akter, J., Rahman, M. A., & Aziz, S. M. S. (2018). Varietal Screening of Mungbean against Whitefly and Aphid. *Journal of Bioscience and Agriculture Research,* 18(1), 1478-1487.
Crossref: https://doi.org/10.18801/jbar.180118.183

I. Introduction

Mungbean (*Vigna radiate* (L.) R.Wilczek) belongs to the family Fabaceae (Lambridges & Godwin, 2006). It is an important grain legume and is extensively grown in tropical and subtropical countries of the world (Asante *et al.*, 2002). After chickpea, mungbean is called as poor people diet owing to its protein nature and is meeting the major protein demand of the people (Shafique *et al.*, 2009). It is a short duration crop, and is priced for its seeds which have high protein level and easily digestible & consumed as food. Because of its non-flatulent behavior (digestibility) and high protein level, it has an edge over other pulses (Ghafoor *et al.*, 2003). It has the ability to fix nitrogen to the soil because of its root nodules (Hoorman *et al.*, 2009). There are 64 species of insects attacking on mungbean crop and among them sucking pests are the most notorious one (Lal, 1985). Several insect pests have been reported to infest mungbean damaging the crops during seedlings, leaves, stems, flowers, buds and

Published with open access at journalbinet.com
EISSN: 2312-7945,

pods causing considerable losses. More than twelve species of insect pests were found to infest mungbean in Bangladesh, aphid, whitefly, thrips and jassids are important (Hossain *et al.*, 2004; Kabir *et al.*, 2014). These insect pests not only reduce the growth of the plant by sucking the sap but also transmit diseases and affect the photosynthesis too (Sachan *et al.*, 1994). Incidence of insect pests considerably reduces the yield and quality of mungbean (Malik, 1994). Among the sap-sucking type of insect pest whitefly and aphid are major insect of mungbean (Isman, 2008). In mungbean crop, whiteflies play a key role in the spread of mungbean yellow mosaic virus which is known as a serious disease of this crop (Akhtar *et al.*, 2012). Heavy attack of whitefly causes the loss of cell sap of plants, make plants weakened and sickly black appearance to plants due to injection of body toxins of whitefly.

At present day, management of insect pest has largely been relied on chemical control. However, the demands for clean and ecologically sound control envisages, careful planning for rationalizing the insecticides interventions. Variety plays an important role in producing high yield of mungbean because different varieties perform differently for their genotypic characters also vary from genotype to genotype. Development of resistant varieties is an ideal component against buildup of pest population at no additional cost, compatible with other methods of pest control and free from control pollution. Various biophysical and biochemical characters of the plants play an important role by providing resistance against this pest. The exploitation of host plant resistance, an economically viable genotypes measure against insect pests has become imperative to find out resistance source with higher yield (Tamang *et al.*, 2017). The growth process of mungbean plants under a given agro-climatic condition differs with variety. Bangladesh Agricultural Research Institute (BARI) has released different varieties of mungbean against the pest. There was no definite and conclusive screening work against these insect pests. Therefore, the present study was undertaken to find out the resistance of the variety against whitefly and aphid and to evaluate the incidence of whitefly and aphid as a sucking pest during the cultivation period.

II. Materials and Methods

Experimental site: The experiment was conducted at the Research Farm of Sher-e-Bangla Agricultural University (SAU), Dhaka during the period from March to June, 2017. It was located in 24.09^0 N latitude and 90.26^0 E longitudes. The soil of experimental area was silty clay in texture. Soil pH was 6.7 and has organic carbon 0.45%.

Treatments and experimental design: BARI Mungbean varieties were used as the test crop of this experiment. The seeds of these mungbean varieties were collected from Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur. Six (06) mungbean varieties *viz.* BARI Mung-1, BARI Mung-2, BARI Mung-3, BARI Mung-4, BARI Mung-5 and BARI Mung-6 were used as treatment for this study. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications. An area was divided into three equal blocks. Each block was divided into 6 plots resulting 18 plots in total. The size of the each unit plot was 5 m^2. The distance maintained between two blocks and two plots were 1.0 m and 0.5 m, respectively.

Planting Time and Procedure: The seeds of mungbean were sown in solid rows in the furrows having a depth of 2-3 cm with maintaining row to row distance 30 cm and plant to plant 10 cm. Recommended doses of fertilizers *viz.* urea, TSP, MoP, gypsum and boric acid were applied. All of the fertilizers were applied during final land preparation. Intercultural operations and plant protection measures were taken during plant growing stage.

Data collection: Ten plants were selected randomly from each plot. Data on the following parameters were recorded during the period of experiment such as:- number of whitefly and aphid at vegetative, flowering and fruiting stages, plant infestation by whitefly and aphid at early, mid and late vegetative, flowering and fruiting stage; number of pods $plant^{-1}$; pod length (cm); seeds pod^{-1}; weight of 1000 seeds and yield (t ha^{-1}). Disease severity was recorded at weekly interval using 0-5 scale (Bashir, 2005) (Table 01).

Published with open access at journalbinet.com
EISSN: 2312-7945, © 2018 The Authors, Research paper

The percent of plant infestation was calculated by using the following formula (Yogeeswarudu and Krishna, 2014):

$$\text{Plant infestation (\%)} = \frac{\text{Number of infested plants}}{\text{Total number of plants}} \times 100$$

Table 01. Disease severity was recorded at weekly interval using 0-5 scale (Bashir, 2005)

Disease Severity	Percent infection	Infection category	Reaction Group
0	Healthy plant	Highly resistant	HR
1	1 - 10% Infection	Resistant	RR
2	11 -20% infection	Moderately resistant	MR
3	21-30% infection	Moderately susceptible	MS
4	30-50 % infection	Susceptible	S
5	More than 50%	Highly susceptible	HS

Statistical analysis: The final data was statistically analyzed with analysis of variance (ANOVA) and means were separated by using least significant difference (LSD) test at 5% level of significance (Gomez and Gomez, 1984).

III. Results and Discussion

Whitefly population at vegetative, flowering and fruiting stage: The number of whitefly population plant^{-1} at early, mid and late vegetative, flowering and fruiting stage showed statistically significant differences due to different mungbean varieties (Table 02). At early, mid and late vegetative stages the lowest number of whitefly plant^{-1} (0.63, 6.43 and 3.71, respectively) were observed from BARI Mung-6, while the highest number of whitefly (2.73, 12.13 and 7.60, respectively) was recorded from BARI Mung-1. At early, mid and late flowering stages the lowest number of whitefly plant^{-1} (2.60, 2.20 and 1.77, respectively) were observed from BARI Mung-6, while the highest number of whitefly (5.23, 4.90 and 4.43, respectively) was recorded from BARI Mung-1. At early, mid and late fruiting stages the lowest number of whitefly plant^{-1} (2.00, 1.33 and 0.63, respectively) were observed from BARI Mung-6, while the highest number of whitefly (4.13, 3.90 and 2.73, respectively) was recorded from BARI Mung-1.

Percent infestation of plant at vegetative stage by whitefly: Percent infestation of plant at different vegetative stages by whitefly showed statistically significant differences for different mungbean genotypes (Table 03). At early, mid and late vegetative stage, the lowest percent infestation of mungbean plants (10.09, 11.76 and 13.12%, respectively) was attained in BARI Mung-6, whereas the highest infestation (17.65, 19.62 and 20.59%, respectively) was observed in BARI Mung-1.

Table 02. Population incidence of whitefly per plant on mungbean under different genotypes at early, mid and late vegetative, flowering and fruiting stages

Treatments	Number of whitefly plant^{-1}								
	Vegetative			Flowering			Fruiting		
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
BARI Mung-1	2.73 a	12.13 a	7.60 a	5.23 a	4.90 a	4.43 a	4.13 a	3.90 a	2.73 a
BARI Mung-2	2.33 ab	10.67 b	7.30 a	4.73 a	4.30 a	4.13 a	3.33 b	3.30 b	2.33 b
BARI Mung-3	2.17 b	10.24 b	6.00 b	4.03 b	3.87 b	3.67 b	3.10 b	3.00 b	2.17 b
BARI Mung-4	1.03 d	8.91 c	4.96 c	3.33 c	3.03 c	2.27 d	2.17 d	1.93 d	1.03 d
BARI Mung-5	1.70 c	7.56 d	4.12 d	3.83 bc	3.63 bc	3.07 c	2.60 c	2.30 c	1.70 c
BARI Mung-6	0.63 d	6.43 d	3.72 d	2.60 d	2.20 d	1.77 e	2.00 d	1.33 e	0.63 e
$LSD_{(0.05)}$	0.413	1.206	0.873	0.613	0.824	0.382	0.411	0.503	0.316
CV (%)	4.68	5.59	7.55	4.22	3.89	5.33	6.02	7.15	5.11

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Published with open access at journalbinet.com
EISSN: 2312-7945,

Table 03. Percent infestation of plant of mungbean by whitefly in different genotype at early, mid and late vegetative stages

Treatments	Percent infestation of plant plot^{-1} at		
	Early vegetative stage	Mid vegetative stage	Late vegetative stage
BARI Mung-1	17.65 a	19.62 a	20.59 a
BARI Mung-2	16.68 a	18.62 a	20.59 a
BARI Mung-3	12.86 c	17.09 b	16.15 b
BARI Mung-4	14.71 b	16.68 b	17.65 b
BARI Mung-5	13.74 b	15.68 bc	14.15 c
BARI Mung-6	10.09 d	11.76 d	13.12 c
$LSD_{(0.05)}$	1.231	1.231	1.562
CV(%)	5.98	6.22	6.44

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Percent infestation of plant at flowering stage by whitefly: Percent infestation of plant at different flowering stages by whitefly showed statistically significant differences for different mungbean genotypes (Table 04). At early, mid and late flowering stage, the lowest percent infestation of mungbean plants (4.48, 6.67 and 7.60%, respectively) were observed in BARI Mung-6, whereas the highest infestation (10.00, 12.23 and 12.23%, respectively) were observed in BARI Mung-1.

Table 04. Percent infestation of plant of mungbean by whitefly in different genotype at early, mid and late flowering stages

Treatments	Percent infestation of plant plot^{-1} at		
	Early flowering stage	Mid flowering stage	Late flowering stage
BARI Mung-1	10.00 a	12.23 a	12.23 a
BARI Mung-2	7.77 b	11.10 b	11.10 b
BARI Mung-3	7.77 b	10.00 c	10.00 c
BARI Mung-4	6.67 c	8.90 d	8.90 d
BARI Mung-5	5.57 d	7.77 e	7.77 e
BARI Mung-6	4.48 e	6.67 f	7.60 e
$LSD_{(0.05)}$	0.943	1.012	1.003
CV(%)	5.46	7.03	5.64

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Percent infestation of pod at fruiting stage by whitefly: Percent infestation of pod at different fruiting stages by whitefly showed statistically significant differences for different mungbean genotypes (Table 05). At early, mid and late fruiting stage, the minimum percent infestations of pods (3.26, 4.53 and 3.24%, respectively) were observed in BARI Mung-6, whereas the maximum infestation (9.35, 10.04 and 10.98%, respectively) was observed in BARI Mung-1.

Table 05. Percent infestation of pod of mungbean by whitefly in different genotype at early, mid and late fruiting stages

Treatments	Percent infestation of Pod plot^{-1} at		
	Early fruiting stage	Mid fruiting stage	Late fruiting stage
BARI Mung-1	9.35 a	10.04 a	10.98 a
BARI Mung-2	7.26 b	8.08 b	7.88 b
BARI Mung-3	5.98 c	5.97 c	6.07 c
BARI Mung-4	5.39 c	5.29 c	3.98 d
BARI Mung-5	3.55 d	4.80 cd	4.24 d
BARI Mung-6	3.26 d	4.53 d	3.24 e
$LSD_{(0.05)}$	0.856	1.045	0.341
CV(%)	5.34	6.22	7.05

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Published with open access at journalbinet.com
EISSN: 2312-7945,

Aphid population at vegetative, flowering and fruiting stage: The number of aphid population plant^{-1} at early, mid and late vegetative, flowering and fruiting stage showed statistically significant differences due to different mungbean varieties (Table 06). At early and mid vegetative stages the lowest number of aphid plant^{-1} (3.70 and 7043, respectively) were observed from BARI Mung-6 and late vegetative stages the lowest number of aphid plant^{-1} (5.12) was observed from BARI Mung-5, while the highest number of aphid at early and mid stages (4.37 and 12.31, respectively) was recorded from BARI Mung-1 and late vegetative stage (7.73) was observed from BARI Mung-2. At early, mid and late flowering stages the lowest number of aphid plant^{-1} (2.23, 3.00 and 3.00, respectively) were observed from BARI Mung-6, while the highest number of aphid (3.67, 3.7 and 4.47, respectively) was recorded from BARI Mung-1. At early, mid and late fruiting stages the lowest number of aphid plant^{-1} (3.73, 3.27 and 2.10, respectively) were observed from BARI Mung-6, while the highest number of aphid (4.83, 4.27 and 3.07, respectively) was recorded from BARI Mung-1.

Table 06. Population incidence of aphid per plant on mungbean under different genotypes at early, mid and late vegetative, flowering and fruiting stages

Treatments	Number of aphids plant^{-1}								
	Vegetative			Flowering			Fruiting		
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
BARI Mung-1	4.37 a	12.31 a	7. 26 a	3.67 a	3.77 a	4.47 a	4.83 a	4.27 a	3.07 a
BARI Mung-2	4.33 a	11.46 b	7.73 a	3.17 b	3.63 a	4.37 a	4.77 a	3.90 a	2.37 b
BARI Mung-3	4.17 a	10.45 c	6.45 b	2.97 b	3.67 a	4.00 b	4.67 a	3.80 a	2.43 b
BARI Mung-4	3.03 c	8.98 d	5.96 b	2.87 b	3.33 bc	3.77 c	3.87 b	3.27 b	2.37 b
BARI Mung-5	3.70 b	7.43 e	5.12 c	2.93 b	3.20 bc	3.07 d	4.40 ab	3.60 ab	2.17 c
BARI Mung-6	2.63 d	5.43 f	5.72 b	2.23 c	3.00 c	3.00 d	3.73 b	3.27 b	2.10 c
$LSD_{(0.05)}$	0.341	0.741	0.541	0.455	0.281	0.246	0.362	0.474	0.196
CV (%)	4.24	7.91	5.61	6.23	3.41	5.04	4.38	6.00	4.22

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Percent infestation of plant at vegetative stage by aphid: Percent infestation of plant at different vegetative stages by aphid showed statistically significant differences for different mungbean genotypes (Table 07). At early, mid and late vegetative stage, the lowest percent infestation of mungbean plants (2.23, 3.33 and 5.50%, respectively) was attained in BARI Mung-6, whereas the highest infestation (7.68, 10.86 and 11.97%, respectively) was observed in BARI Mung-1. Percent infestation of plant at flowering stage by aphid: Percent infestation of plant at different flowering stages by aphid showed statistically significant differences for different mungbean genotypes (Table 08). At early, mid and late flowering stage, the lowest percent infestation of mungbean plants (5.57, 6.67 and 6.74%, respectively) were attained in BARI Mung-6, whereas the highest infestation (11.97, 14.12 and 15.06%, respectively) were observed in BARI Mung-1.

Table 07. Percent infestation of plant of mungbean by aphid in different genotype at early, mid and late vegetative stages

Treatments	Percent infestation of plant plot^{-1} at		
	Early vegetative stage	Mid vegetative stage	Late vegetative stage
BARI Mung-1	7.68 a	10.86 a	11.97 a
BARI Mung-2	6.59 b	8.80 b	10.00 b
BARI Mung-3	5.50 c	7.68 c	8.80 c
BARI Mung-4	3.30 e	5.57 d	7.68 d
BARI Mung-5	4.39 d	4.43 e	6.59 e
BARI Mung-6	2.23 f	3.33 f	5.50 f
$LSD_{(0.05)}$	0.693	0.962	0.803
CV (%)	6.34	4.09	6.11

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Published with open access at journalbinet.com
EISSN: 2312-7945,

Table 08. Percent infestation of plant of mungbean by aphid in different genotype at early, mid and late flowering stages

Treatments	Percent infestation of plant $plot^{-1}$ at		
	Early flowering stage	Mid flowering stage	Late flowering stage
BARI Mung-1	11.97 a	14.12 a	15.06 a
BARI Mung-2	8.80 b	12.10 b	12.10 b
BARI Mung-3	7.77 c	10.98 c	10.98 c
BARI Mung-4	7.68 c	8.90 d	8.90 d
BARI Mung-5	6.59 d	8.80 d	7.77 e
BARI Mung-6	5.57 e	6.67 e	6.74 f
$LSD_{(0.05)}$	0.894	1.134	0.896
CV(%)	6.35	5.98	6.22

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Percent infestation of pod at fruiting stage by aphid: Percent infestation of pod at different fruiting stages by aphid showed statistically significant differences for different mungbean genotypes (Table 09). At early, mid and late fruiting stage, the minimum percent infestation of pods (3.15, 4.63 and 4.70%, respectively) was observed in BARI Mung-6, whereas the maximum infestation (10.01, 8.58 and 11.64%, respectively) was observed in BARI Mung-1.

Yield attributes and yield of mungbean: Different yield attributes and yield of mungbean showed statistically significant differences due to different varieties (Table 10). The highest number of pods $plant^{-1}$, pod length, number of seeds pod^{-1}, 1000-seed weight and seed yield ha^{-1} (35.53, 8.48 cm, 11.30, 41.10 g and 1.82 t ha^{-1}, respectively) were recorded from BARI Mung-6, whereas the lowest number of pods $plant^{-1}$, pod length and 1000-seeds weight (32.00, 7.73 cm and 35.50 g, respectively) were recorded in BARI Mung-1 and number of seeds pod^{-1} and seed yield ha^{-1} (10.07 and 1.30 t ha^{-1}, respectively) were recorded in BARI Mung-4. BARI Mung-6 showed the highest yield and yield attributing parameter due to more resistance against sucking insect pests and less infection or attack caused by sucking insect pests like as whitefly and aphid, on the other hand other BARI Mung varieties are comparatively less resistance than BARI Mung-6 varieties against sucking insect pests and more attack caused by whitefly and aphid that's why yield and yield attributing parameter are less than BARI Mung-6 variety.

Table 09. Percent infestation of pod of mungbean by aphid in different genotype at early, mid and late fruiting stages

Treatments	Percent infestation of Pod $plot^{-1}$ at		
	Early fruiting stage	Mid fruiting stage	Late fruiting stage
BARI Mung-1	10.01 a	8.58 a	11.64 a
BARI Mung-2	8.18 b	7.73 b	8.81 b
BARI Mung-3	6.35 c	7.14 b	6.96 c
BARI Mung-4	5.78 d	5.29 c	5.81 d
BARI Mung-5	4.20 e	5.14 c	5.47 d
BARI Mung-6	3.15 f	4.63 d	4.70 e
$LSD_{(0.05)}$	0.794	0.304	0.782
CV(%)	6.13	6.22	6.02

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

V. Discussion

Previous workers like Chhabara and Kooner (1991); Sahoo and Hota (1991); Chhabra and Kooner (1993) and Chhabra and Kosoner (1994) have evaluated mungbean cultivars against their resistance to insect pests and screened a large numbers of mungbean genotypes for resistance/ susceptibility against sucking pests. Our present findings are in accordance to the results reported by Naqvi *et al.* (1995) who have screened ten cultivar of mungbean and found none of them were complete resistant

Published with open access at journalbinet.com
EISSN: 2312-7945, © 2018 The Authors, Research paper

against sucking pests as we have in our study. They tested 10 genotypes of mungbean against insects and found only two cultivars, M-8-20 and M-1030 resistant against insects compared to others.

Table 10. Yield and yield contributing characters of different mungbean varieties

Treatments	Number of pods plant^{-1}	Pod length (cm)	Number of Seeds pod^{-1}	1000-seed weight (g)	Yield (t ha^{-1})
BARI Mung-1	32.00 c	7.73 c	10.23 c	35.50 e	1.50 b
BARI Mung-2	33.87 b	7.90 bc	10.83 b	40.53 b	1.67 ab
BARI Mung-3	33.60 b	7.85 bc	10.50 bc	39.78 c	1.61 b
BARI Mung-4	29.33 d	7.42 c	10.07 cd	37.41 d	1.30 c
BARI Mung-5	33.53 b	8.46 a	10.83 b	40.78 ab	1.75 a
BARI Mung-6	35.53 a	8.48 a	11.30 a	41.10 a	1.82 a
$LSD_{(0.05)}$	1.421	0.352	0.402	0.386	0.124
CV (%)	5.44	6.03	4.22	4.89	5.04

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

Nadeem *et al.* (2014) showed the significant variations in the population levels of whiteflies, aphid, thrips and jassids observed per leaf basis in different mungbean cultivars in response to yield of grains. Among the tested cultivars, none showed complete resistance against whiteflies however, MH 3153 (advance genotype/cultivar) showed comparatively better resistance against sucking insects. Consistent results to our findings has been reported by Khattak *et al.* (2004) who has screened five cultivars of mungbean viz., NM 92, NM 98, NM 121-125, M-1 and NCM-209 for resistance against whiteflies, jassid and thrips and found none has complete resistance. Whereas, mungbean varieties, NM-92 and NM-98 showed comparatively better resistant cultivars regarding low mean population of whiteflies as compared to other tested varieties. Farooq *et al.* (2018) showed the screening experiment of 100 mungbean cultivars against MYMV which vector is whitefly. None of the variety showed complete resistance or immune reaction against MYMV. Out of 100 varieties/accessions only seven mungbean accessions showed moderately resistant response against MYMV infestation. The MYMV vector, whitefly (*Bemesia tabaci* Genn) appeared to inhabit plant soon after the emergence and remained till maturity and with the passage of time, disease severity increased significantly. Results are also in accordance with Iqbal *et al.* (2011). Mungbean yellow mosaic virus is DNA Begomovirus and it is transmitted in persistent manner by whitefly *Bemesia tabacai* (Islam *et al.,* 2002). There was only one variety of mungbean (Plant-U30) that was resistant to whitefly and MYMV (Khattak *et al.,* 2003). A rare resistance in mungbean genotypes though presence of resistance was found in urdbean and soybean genotypes (Lavanya *et al.,* 2008). Resistance against MYMV was rare in mungbean, but was found in urdbean (*Vigna mungo*) and soybean (*Glycine max*), which led them to successful hybridization and inter-specific transfer of resistance (Nair and Nene, 1973). Similarly, Ahmed (1975) evaluated 157 local and exotic mungbean varieties but no resistant variety was found, however 6 out of 34 local collections showed resistance response to disease. Tamang *et al.* (2017) find out the differential responses of 5 mungbean varieties to insect pests where none of the genotype/line was found to be highly resistant to insect pest. Among the mungbean varieties, Bireswar (WBM-34-1-1) and Sukumar (WBM-29) showed comparatively better resistant cultivars regarding low mean population of sucking pest as compared to other tested varieties. There was only one variety of mungbean (Plant-U30) that was resistant to whitefly and yellow mosaic disease (Sahoo & Hota, 1991). Results are also in accordance with Patel *et al.* (2010), who reported maximum population of aphid (10.22 aphids/10 cm twig) on mungbean. Shafique *et al.* (2009) observed the check variety for resistance against chickpea pod borer (CPB), *Helicoverpa armigera* (Hubner) (Lepidoptera: Noctuidae) infestation in a field trial during 2006-2007. None of the tested genotypes showed complete resistance against CPB after studying larval population, pod damage and grain yield parameters. Bhople *et al.* (2017) evaluated the ten genotypes of mungbean. Among them PHULE M-702-1 was found resistance to aphid and PKV GREEN GOLD to whitefly as these genotypes recorded significantly the lowest population of respective pests in mungbean. Ahmad *et al.* (2007) reported that the aphid population ranged from 64.0 to 234.0 (Av. of 90 observations) per 2.5 cm terminal shoot length and foliar damage index ranged from 0.6 to 3.5 per plant on mungbean genotypes. The present study is in agreement with that of Singh and Singh (2014) who screened 30 genotypes of mungbean [*Vigna radiata* (L.)

Published with open access at journalbinet.com
EISSN: 2312-7945, © 2018 The Authors, Research paper

Wilezek] against white fly (*Bemisia tabaci*), and reported minimum population of white fly was recorded on genotype TMB-36, followed by RMG-1004 and maximum in BM-2003-2 and HUM-12. Results are also in accordance with Khaliq *et al.* (2017).

IV. Conclusion

Results of the present findings lead towards a conclusion that, among the six tested cultivars, none of the variety showed complete resistance or immune reaction against whitefly and aphid. Among the six BARI mungbean varieties BARI Mung-6 was found resistance and least affected by sucking insects in terms of lowest whitefly and aphid infestation and gave the higher yield than other tested varieties/genotypes.

V. References

[1]. Ahmad, H., Shankar, U., Monobrullah, M., Bhagat, R. M. and Saroch. V. K. (2007). Screening of mungbean (*Vigna radiata* L.) genotypes against aphid, (*Aphis craccivora* Koch). *Journal of Research of Sher-e-Kashmir University of Agricultural Science and Technology,* 6(1), 113-116.

[2]. Ahmed, M. (1975). Screening of mungbean (*Vigna radiata*) and urdbean (*Vigna mungo*) germplasm for resistance to mungbean yellow mosaic. *Journal of Agricultural Research*, 13(1), 349-354.

[3]. Akhtar, K. P., Sarwar, G., Abbas, G., Asghar, M. J. and Hamed, M. (2012). Mungbean phyllody disease in Pakistan: symptomatology, transmission, varietal response and effects on yield characteristics. *International Journal of Pest Management*, 58, 139-145. https://doi.org/10.1080/09670874.2012.669870

[4]. Asante, S. K., Tamo M. and Jackai, L. E. N. (2002). Integrated management of cowpea insect pests using elite cultivars date of planting and minimum insecticide application. *African Crop Science Journal*, 3(1), 23–25.

[5]. Bashir, M. (2005). Studies on viral diseases of major pulse crops and identification of resistant sources. Technical Annual Report (April, 2004 to June, 2005) of ALP Project. Crop Sciences Institute, National Agricultural Research Centre, Islamabad, p.169.

[6]. Bhople, S. K., Dhandge, S. R., Aravindarajan, G. and Patange, N. R. (2017). Varietal screening of mungbean genotypes for their resistance against pest complex of mungbean. *AGRES – an International e-Journal,* 6(1), 123-128.

[7]. Chhabra, K. S. and Kooner, B. S. (1991). Source of resistance in mungbean against insect pests and yellow mosaic virus. *Legal Research*, 14(4), 175-184.

[8]. Chhabra, K. S. and Kooner, B. S. (1993). Response of some promising mungbean genotypes towards whitefly, jassids and mungbean yellow mosaic virus. *Journal of Insect Science*, 6(2), 215-218.

[9]. Chhabra, K. S. and Kosoner, B. S. (1994). Reaction of some promising mungbean genotypes towards whitefly, jassid and yellow mosaic virus. *Pest Management of Ecology and Zoology*, 2(1), 11-14.

[10]. Farooq, M., Ilyas, N., Khan, M. N., Saleem, M., Fazal, R., Ahmed, S., Bakhtiar, M. and Ilyas, N. (2018). Evaluation of resistance in mungbean (*Vigna radiata* (L.) R. Wilczek) germplasm against mungbean yellow mosaic virus (MYMV) with reference to epidemiological studies. *International Journal of Fauna and Biological Studies*, 5(3), 47-56.

[11]. Ghafoor, A., Ahmad, Z. and Quyyum, A. (2003). Black grain (*Vigna mungo* L. Hepper) germplasm catalogue, plant genetic resources programme, PARC/JIGA, Ohio, p.17.

[12]. Gomez, K. A. and Gomez, A. A. (1984). Statistical procedures for agricultural research. John Wilely and Sons, New York, p.182.

[13]. Hoorman, J. J., Islam, R. and Sundermeier, A. (2009). Sustainable crop rotations with cover crops, Ohio State University, Extension Fact Sheet Agriculture and Natural Resources, SAG, Green Global Foundation, Online Journal of Tejgaon, Dhaka, Bangladesh, Pp.9–19.

[14]. Hossain, M. A., Ferdous, J., Sarkar, M. A. and Rahman, M. A. (2004). Insecticidal management of thrips and pod borer in mungbean. *Bangladesh Journal of Agricultural Research*, 29(3), 347-356.

Published with open access at journalbinet.com
EISSN: 2312-7945,

[15]. Iqbal, U., Iqbal, S. M., Afzal, R., Jamal, A., Farooq, M. A. and Zahid, A. (2011). Screening of mungbean germplasm against mungbean yellow mosaic virus (MYMV) under field conditions. *Pakistan Journal of Phytopathology*, 23(1), 48-51.

[16]. Islam, M. R., Ali, M. A., Islam, M. S., and Hossain, A. F. M. G. F. (2002). Effect of nutrients and weeding on the incidence of mungbean mosaic. *Pakistan Journal of Plant Pathology*, 1(2-4), 48-50.

[17]. Isman, M. B. (2008). Botanical insecticides: For richer, for poorer, Pest Management. *Science*, 64(1), 8–11. https://doi.org/10.1002/ps.1470

[18]. Kabir, M. M., Hossain, M. A., Farhat, T., Yasmin, S. and Rahman, N. F. (2014). Effects of different botanicals and chemicals on the incidence of sucking insect pests and the impact on mosaic disease of mungbean. *International Journal of Research and Development*, 3(5), 62–68.

[19]. Khaliq, N., Koul, V., Shankar, U., Ganai, S. A., Sharma, S. and Norboo, T. (2017). Screening of mungbean (*Vigna radiata* (L.) Wilczek) varieties against whitefly (*Bemisia tabaci* Genn.) and mungbean yellow mosaic virus (MYMV). *International Journal of Current Microbiology and Applied Science,* 6(8), 129-132. https://doi.org/10.20546/ijcmas.2017.608.017

[20]. Khattak, G. S. S., Zamir, R., Muhammad, T. and Shah, S. A. (2003). Breeding mungbean (*Vigna radiata* (L.) Wilczek) genotypes for the agro climatic conditions of NWFP. *Pakistan Journal of Botany,* 35(5), 763-770.

[21]. Khattak, M. K., Ali, S. and Chishti, J. I. (2004). Varietal resistance of mungbean (*Vigna radiata* L.) against whitefly (*Bemisia tabaci* genn.), jassid (*Amrasca devastans* dist.), and thrips (*Thrips tabaci* lind.). *Pakistan Entomology*, 26(1), 9-12.

[22]. Lal, S. S. (1985). A review of insect pests of mungbean and their control in India. *Tropical Pest Management*, 31, 105-114. https://doi.org/10.1080/09670878509370960

[23]. Lambridges, C. J. and Godwin, I. D. (2006). *Mungbean.* In: Chittarajan K. (eds.) Genome mapping and molecular breeding in plants. Wagenigen, 3, 69–90.

[24]. Lavanya, G. R., Srivastava, J. and Ranade, S. A. (2008). Molecular assessment of genetic diversity in mungbean germplasm. *Journal of Genetics*, 87, 65-74. https://doi.org/10.1007/s12041-008-0009-3

[25]. Malik, B. A. (1994). Grain legumes: Crop production. *Melanagromyza sojae* (Zehntner) on soybean. *Indian Journal of Plant Protection*, 18, 271-275.

[26]. Nadeem, S., Hamed, M., Asghar, M. J., Abbas, G. and Saeed, N. A. (2014). Screening of mungbean [*Vigna radiate* (L.) Wilczek] genotypes against sucking insect pests under natural field conditions. *Pakistan Journal of Zoology*, 46(3), 863-866.

[27]. Nair, N. G. and Nene, Y. L. (1973). Studies on the yellow mosaic of urd bean (*Phaseolus mungo* L.) caused by mungbean yellow mosaic virus. II. Virus-vector relationships. *Indian Journal of Farm Science,* 1, 62-70.

[28]. Naqvi, S. H., Talpur, M. A., Khan, M. M., Rustamani, M. A., Mand, M. and Hussain, T. (1995). Relative resistance of mungbean (*Vigna radiata* (L.) R.Wilczek), varieties to whitefly and yellow mosaic virus. Proceed. XIV Pakistan Congress of Zoology, 15-17 April Islamabad, Pakistan, 15, 247-251.

[29]. Patel, S. K., Patel, B. H., Korat, D. M. and Dabhi, M. R. (2010). Seasonal incidence of major insect pests of cowpea, *Vigna unguiculata* (L.) Walpers in relation to weather parameters. *Karnataka Journal of Agricultural Science*, 23(3), 497-499.

[30]. Sachan, J. N., Yadava, C. P., Ahmad, R. and Katti. G. (1994). Insect pest management in pulse crop. In: Dhaliwal GS, Arora R. (eds.) Agricultural insect pest management. Common Wealth Publishers, New Delhi, India, Pp.45-48.

[31]. Sahoo, B. K. and Hota, A. K. (1991). Field screening of greengram germplasm against insect pest and disease complex. *Madras Agricultural Journal,* 78(1-4), 84-86.

[32]. Shafique, M., Nadeem, S., Hamed, M., Atta, B. M. and Shah, T. M. (2009). Performance of some advance desi chickpea genotypes against pod borer, *Helicoverpa armigera* (Hubner) resistance. *Pakistan Journal of Zoology,* 41(4), 277-280.

[33]. Tamang, S., Venkatarao, P. and Chakraborty, G. (2017). Varietal screening of mungbean cultivars for resistance/tolerance against insect pest under terai agro ecological zone of West Bengal. *International Journal of Plant Protection*, 10(1), 7-15. https://doi.org/10.15740/HAS/IJPP/10.1/7-13

Published with open access at journalbinet.com
EISSN: 2312-7945, © 2018 The Authors, Research paper

[34]. Yogeeswarudu, B. and Venkata Krishna, K. (2014). Field studies on efficacy of novel insecticides against *Helicoverpa armigera* (Hubner) infesting on Chickpea. *Journal of Entomology and Zoology Studies*, 2(5), 35-38.

HOW TO CITE THIS ARTICLE?

Crossref: https://doi.org/10.18801/jbar.180118.183

MLA

Abdullah-Al-Rahad, *et al.* "Varietal Screening of Mungbean against Whitefly and Aphid." *Journal of Bioscience and Agriculture Research* 18 (1) (2018): 1478-1487.

APA

Abdullah-Al-Rahad, M., Rahman, M. S., Akter, T., Akter, J., Rahman, M. A., & Aziz, S. M. S. (2018). Varietal Screening of Mungbean against Whitefly and Aphid. *Journal of Bioscience and Agriculture Research,* 18(1), 1478-1487.

Chicago

Abdullah-Al-Rahad, Mohammad, Md Saidur Rahman, Tahmina Akter, Jasmin Akter, M A Rahman, and Sheik Md Showkat Aziz. "Varietal Screening of Mungbean against Whitefly and Aphid." *Journal of Bioscience and Agriculture Research*, 18 (1) (2018): 1478-1487.

Harvard

Abdullah-Al-Rahad, M., Rahman, M. S., Akter, T., Akter, J., Rahman, M. A. and Aziz, S. M. S. 2018. Varietal Screening of Mungbean against Whitefly and Aphid. *Journal of Bioscience and Agriculture Research,* 18 (01), pp. 1478-1487.

Vancouver

Abdullah-Al-Rahad M, Rahman MS, Akter T, Akter J, Rahman MA, Aziz SMS. Varietal Screening of Mungbean against Whitefly and Aphid. Journal of Bioscience and Agriculture Research. 2018 December 18(1): 1478-1487.