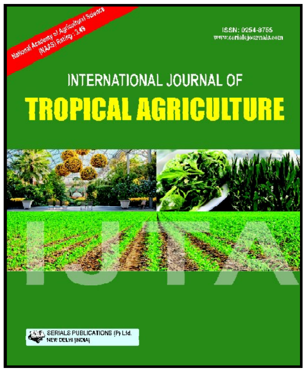

INTERNATIONAL JOURNAL OF TROPICAL AGRICULTURE

ISSN : 0254-8755

available at http: www.serialsjournals.com

Volume 36 • Number 4 • 2018

Variability Among Mungbean (*Vigna Radiata*) Genotypes for Yield and Yield Contributing Traits

Patel K. C. and Patel K. R.

Research and Development Department, Dinkar Seeds Private Limited, Himmatnagar

Abstract: To evaluate the performance of mungbean genotypes, an experiment was conducted at Research and Development Farm of Dinkar Seeds Pvt. Ltd., At-Hingalaj, Ta-Idar, Dist-Sabarkantha. The experiment was laid out in randomized complete block design with three replications. Data was collected on number of leaves plant^{-1}, pod length, number of pods plant^{-1}, number of seeds pod-1, 100-seed weight and seed yield plant^{-1}. Significant variations were observed for all the parameters except number of pods plant^{-1}. Genotype Middle Gujarat produced maximum number of leaves plant^{-1} where as the maximum number of seeds per pod-1, 100-seed weight (g) and seed yield plant^{-1} (g) observed in sharif-12, while the minimum seed yield plant^{-1} was recorded in Middle Gujarat. Maximum pod length was recorded for genotype sharif-6. Genotype SML-668 produced maximum number of pod plant-1. This variation may be used for further breeding programme to develop improved mungbean genotypes, adapted to the climatic condition of Gujarat through crossing and selection.

Keywords: Mungbean genotypes, yield, genetic variability, morphological traits.

INTRODUCTION

Pulses are basic ingredient in the diets of a vast majority of Indian population as they provide a perfect mix of high biological value protein when supplemented with cereals. Importance of pulses is relatively more in India as its contribution in nutrient supply is greater than Asia and world as a whole. Pulses are also an excellent feed and fodder for livestock. Mungbean (Vigna radiata (L.) Wilczek) or green gram is one of the important pulse crop cultivated widely in India, Pakistan, Sri Lanka, Philippines, Taiwan, Nepal, Thailand, Laos, Kampuchea, Vietnam, Indonesia, Eastern Malaysia, South China and in the dry parts of Java. The leading mungbean growing states in India are Rajasthan, Maharashtra, Andhra Pradesh, Karnataka, Orissa, Gujarat and Bihar. Throughout the India, the mungbean is used for different purposes. The major portion is utilized in making dal, curries, soup, sweets and snacks. Moreover, its food values lie in high and easily digestible protein. The grains contain approximately 25-28 per cent protein, 1.0-1.5 per cent oil, 3.5-4.5 per cent fiber, 4.5-5.5 per cent ash and 62-65 per cent carbohydrates on dry weight basis. According to the Vavilov N. I. (1926) mungbean is originated in Hindustan and central Asiatic regions. It belongs to the family fabaceae with chromosome number 2n = 22. Mungbean is cultivated in about 3.38 million hectares with a total production of 1.61 million tonnes and a productivity of 474 kg/ha in India, Anonymous (2017). Mungbean has established itself as a highly valuable short duration grain legume crop having many desirable characteristics like wider adaptability, low input requirement and ability to improve the soil fertility by fixing atmospheric nitrogen with the help of symbiotic bacteria present in root nodules. Although high degree of heterosis and variability has been reported for mungbean, its commercial exploitation has not been possible because of cleistogamous nature of flower and non-availability of proper sterility mechanisms. The development of pure lines from the variable population is therefore has been the main approach pursued by the plant breeders working on this crop. The yield levels in this crop could be increased by the way of genetic improvement such as incorporation of earliness, uniform maturity, better fertilizer response, photo thermo-insensitivity, high harvest index, wider adaptability and resistance to biotic and abiotic stresses. Variation can be used for genetic improvement of mungbean to develop higher yielding cultivars. Biaswas and Bhadra (1997) studied mungbean lines for variation in pod characters and divided them into four groups for pod length, indicating wide genetic variations. Sharma and Gupta (1994) evaluated various lines for their diversity and observed positive correlation between pod length and yield per plant. Chhabra *et al.* (1991) analyzed simple and multiple correlations between yield and its component traits in mungbean. Islam *et al.* (1999) also studied genetic variability and correlation between yield and yield components in mungbean and found significant differences among various genotypes. The present study was made to evaluate 10 mungbean genotypes to estimate variability among these and to identify the better performing lines, under the climatic condition of Gujarat.

MATERIALS AND METHODS

The experiment was conducted at Research and Development Farm of Dinkar Seeds Pvt. Ltd., At-Hingalaj, Ta-Idar, Dist-Sabarkantha, during kharif 2016-17. The experiment was laid out in randomized complete block design with three replications. Sowing was done in 15 July 2016 keeping plant to plant distance of 15cm and row to row distance of 30cm with 4m row length and four rows per plot. Ten genotypes, among them five genotypes are our company and remaining are collected from universities and local collection. These genotypes were:

1. Sharif-12	2. Sharif-11	3. Sharif-10
4. Sharif-6	5. Sharif-1	6. SML-668
7. TJM-3	8. GG Co-8	9. Peeri mung
10. Middle Gujarat		

Data was collected on number of leaves plant^{-1}, pod length, number of pods plant^{-1}, number of seeds pod^{-1}, 100-seeds weight and seed yield plant^{-1}. The data were statistically analyzed using analysis of variance appropriate for Randomized Complete Block design. Means were compared using LSD test at 0.05 level of probability when the F-values were significant (Steel and Torrie, 1984).

RESULTS AND DISCUSSION

Number of Leaves plant^{-1}

Data regarding number of leaves plant-1 are shown in Table 1. Analysis of the data revealed significant differences for number of leaves plant^{-1}. Maximum number of leaves plant^{-1} was produced by genotype Middle Gujarat (21.70) and SML-668 (21.70) while minimum by genotype TJM-3 (10.70). The data for the parameter ranged from 10.66 to 21.70 (Table 2). The observed differences among the tested genotypes can be attributed to different genetic background.

Pod length (cm)

Significant differences were recorded by the analysis of the data regarding pod length (Table 1). Sharif-6 showed maximum pod length (9.20cm) while Middle Gujarat showed minimum pod length (6.30cm). The data regarding the parameter varied from 6.30cm to 9.20cm (Table 2).

Number of pods plant^{-1}

Analysis of the data regarding number of pods plant^{-1} revealed non-significant differences among the tested genotypes. However, highest number of pods plant^{-1} was recorded for genotype SML-668 (58.66) while least for genotype Middle Gujarat (32.66) (Table 1). Values of the parameter ranged from 32.66 to 58.66 (Table 2). These results are against those of Sharma and Gupta (1994) and Islam *et al.* (1999) who found significant differences for number of pods plant^{-1}.

Number of seeds pod^{-1}

Data regarding number of seeds pod^{-1} are shown in Table 1 and Table 2. Perusal of the data displayed significant difference for number of seeds pod^{-1} (Table 2). Highest number of seeds pod-1 was recorded in Sharif-12 (11.40) which was at par with genotype sharif-1 (10.30), while lowest for peeri mung (7.30).

Table 1

Means values of 16 mungbean genotypes for number of leaves plant^{-1}, pod length, number of pods plant^{-1}, number of seeds pod^{-1} and 100-seeds weight

Genotypes	*Number of leaves plant^{-1}*	*Pod length (cm)*	*Number of pods plant^{-1}*	*Number of seeds pod^{-1}*	*100-seeds weight (g)*	*Seed yield plant^{-1} (g)*
Sharif – 12	20.00	6.40	46.66	11.40	6.40	19.70
NM 20-21	16.30	7.70	45.66	9.30	4.20	15.00
GG Co – 8	12.70	7.30	40.33	8.60	4.10	14.20
Peeri mung	18.70	8.30	55.00	7.30	5.80	14.80
Sharif – 6	14.70	9.20	49.66	9.70	5.70	18.40
Sharif – 11	14.00	7.80	47.00	8.70	4.60	15.20
SML – 668	21.70	7.40	58.66	9.00	3.90	17.20
TJM - 3	10.70	7.30	46.66	8.70	4.60	14.80
Sharif – 1	15.00	7.60	47.00	10.30	4.80	18.40
Middle Gujarat	21.70	6.30	32.66	8.70	4.30	10.90
LSD	2.740	0.8101	ns	1.404	0.5003	1.30

Table 2
Mean square values in ranges of number of leaves plant^{-1}, pod length, number of pods plant^{-1}, number of seeds pod^{-1}, 100-seeds weight and yield plant^{-1}

Trait	*MS*	*Range*
Number of leaves plant^{-1}	31.089 **	Middle Gujarat (21.70) – TJM-3 (10.66)
Number of pods plant^{-1}	156.22 ns	SML-668 (58.66) – Middle Gujarat (32.66)
Pod length (cm)	1.169 **	Sharif-6 (9.20) - Middle Gujarat (6.30)
Number of seeds pod^{-1}	1.110 **	Sharif-12 (11.40) – GG C0-8 (7.66)
100-seeds weight (g)	1.963 **	Sharif-12 (6.40) – SML-668 (3.90)
Seed yield plant^{-1}	9.62 **	Sharif-12 (19.70) – Middle Gujarat (10.90)

* Highly significant differences

100-Seed weight (g)

Analysis of the data revealed significant difference for 100-seed weight among the tested genotypes. Genotype sharif-12 showed maximum 100-seed weight (6.40g) while genotype GG Co-8 produced minimum 100-seeds weight (4.10g). Values regarding the parameter ranged from 6.40g to 3.90g (Table 2).

Seed yield plant-1 (g)

Analysis of the data revealed significant difference among various genotypes for seed yield plant^{-1}. Mungbean genotypes sharif-12 produced maximum yield plant^{-1} (19.70g) which was at par with genotype sharif-6 (18.40g) and sharif-1 (18.40g), while Middle Gujarat produced minimum yield plant^{-1} (10.90g).

CONCLUSION AND RECOMMENDATIONS

The present experiment was conducted to evaluate the performance of mungbean genotypes under climatic conditions of North Gujarat. Significant variations were observed for all the parameters except number of pods plant^{-1}. Genotype Sharif-12 produced maximum number of seeds per pod^{-1} along with better seed yield plant^{-1}. This genotype may be used for subsequent breeding programmes. The tested genotypes with wide variations may be used for further breeding programmes to develop improved mungbean genotypes, adapted to the climatic condition of Gujarat.

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