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VARIABILITY AMONG MUNGBEAN (*VIGNA RADIATA*) GENOTYPES FOR YIELD AND YIELD COMPONENTS GROWN IN PESHAWAR VALLEY

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ABSTRACT

To evaluate the performance of mungbean genotypes, an experiment was conducted at Agricultural Research Farm of NWFP Agricultural University, Peshawar during summer 2005. 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 KRK mung-1 produced maximum number of leaves plant^{-1} and maximum number of seeds per pod^{-1}. Maximum pod length and maximum 100-seeds weight was recorded for genotype NFM 3-3. Mungbean genotypes NM 21 produced maximum seed yield plant^{-1}, followed by NM-92 and KRK mung-1, while FM 3-3 produced minimum seed yield plant^{-1}. This variation may be used for further breeding programmes to develop improved mungbean genotypes, adapted to the climatic condition of Peshawar valley through crossing and selection.

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

INTRODUCTION

Mungbean [*Vigna radiata* (L.) wilczek] is an important pulse crop of Kharif season in Pakistan. Total area of mungbean during 2003-2004 in Pakistan was 255.9 thousand acres with total production of 1.40 million tones and average yield of 550 kg ha^{-1}. It is also known as moong, mungo, green gram and golden gram. It belongs to the family Leguminosae and is native to Indo-Burma (Myanmar) region of Asia. It is an important economical crop of marginal lands. The yield of mungbean depends largely on weather conditions, soil, cultural practices and variety. Our yields are still lower than other mungbean countries. Development of improved varieties with more genetic potential will increase our yield to a greater extent.

A huge amount of diversity is present for mungbean breeders, worldwide. The main germplasm center of mungbean is AVRDC in Taiwan. This 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. Farrage (1995) evaluated 23 mungbean accessions as affected by planting dates. Naidu and Satyanarayana (1993) studied heterosis for yield and yield components 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 16 mungbean genotypes to estimate variability among these and to identify the better performing lines, under the climatic condition of Peshawar.

MATERIALS AND METHODS

The experiment was conducted at Agricultural Research Farm of NWFP Agricultural University, Peshawar, during summer 2005. The experiment was laid out in randomized complete block design with three replications. Sowing was done in April 2005, keeping plant to plant distance of 15cm and row to row distance of 30cm with 4m row length and four rows per plot. Sixteen genotypes, obtained from Nuclear Institute for Food and Agriculture, Tarnab, Peshawar were evaluated. These genotypes were:

1. **6601**	2. **NM 28**	3. **NM 13-1**
4. **NM 19-19**	5. **NM 20-21**	6. **NM 121-25**
7. **NM 51**	8. **NM 54**	9. **NM 92**
10. **NM 98**	11. **Mung-88**	12. **CHK 97**
13. **AEM-96**	14. **KRK mung-1**	15. **NFM 3-3**
16. **Ramzan**		

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 KRK mung-1 (21.70) and Mung-88 (21.70) while minimum by genotype AEM-96 (10.70). The data for the parameter ranged from 10.66 to 21.66 (Table-2). The observed differences among the tested genotypes can be attributed to different genetic background. These results are in agreement with those of Islam *et al*. (1999) who also reported significant variability among various mungbean genotypes for different phenotypic traits.

Pod length (cm)

Significant differences were recorded by the analysis of the data regarding pod length (Table-1). NFM 3-3 showed maximum pod length (9.06cm) while NM 28 showed minimum pod length (6.43cm). The data regarding the parameter varied from 6.43cm to 9.06cm (Table-2). These results are in line with those of Biaswas and Bhadra (1997) who have also reported wide genetic variations for pod length among different mungbean lines.

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 Mung-88 (58.66) while least for genotype NM 98 (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 KRK mung-1 (10.33) while lowest for NM 51 (7.66). These results are supported by previous results as reported by Farrage (1995) who also reported significant variation for number of seed pod^{-1} among different mungbean genotypes.

100-Seed weight (g)

Analysis of the data revealed significant difference for 100-seed weight among the tested genotypes. Genotype NFM 3-3 showed maximum 100-seed weight (6.23g) while genotype Mung-88 produced minimum 100-seeds weight (3.90g). Values regarding the parameter ranged from 6.23g to 3.90g (Table-2). These results are in accordance with those of Patil and Narkhede (1989) and Sharma (1995) who also reported significant differences among various genotypes for 100-seed weight, and positive correlation with final yield.

Seed yield plant^{-1} (g)

Data regarding seed yield plant^{-1} is given in Figure-1. Analysis of the data revealed significant difference among various genotypes for seed yield plant^{-1}. Mungbean genotypes NM 28 produced maximum yield plant^{-1} (19.70g), followed by NM-92 (18.40g) and KRK mung-1 (18.40g), while NFM 3-3 produced minimum yield plant^{-1} (10.90g). These results are in accordance with that of Bhadra *et al.* (1989) and Islam *et al*. (1999), who observed significant difference for yield plant^{-1} among various mungbean genotypes.

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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)
6601	17.00 CDE	6.900 EF	55.33	8.700 B	3.900 D
NM 28	20.00 AB	6.400 F	46.66	8.700 B	4.000 D
NM 13-1	14.30 EFG	7.300 CDE	41.00	8.700 B	4.300 CD
NM 19-19	17.70 BCD	7.200 DEF	34.33	9.300 AB	4.200 CD
NM 20-21	16.30 CDEF	7.700 BCDE	45.66	9.300 AB	4.200 CD
NM 121-25	18.70 BC	7.400 CDE	39.00	9.300 AB	4.100 CD
NM 51	12.70 GH	7.300 CDE	40.33	8.000 B	5.400 B
NM 54	18.70 BC	8.300 AB	55.00	8.300 B	5.800 AB
NM 92	14.70 EFG	7.800 BCD	49.66	8.300 B	5.700 AB
NM 98	14.00 FG	7.800 BCD	32.66	8.700 B	4.600 C
mung 88	21.70 A	7.400 CDE	58.66	9.000 AB	3.900 D
CHK 97	20.00 AB	6.900 EF	42.00	9.000 AB	4.200 CD
AEM 96	10.70 H	7.300 CDE	46.66	8.700 B	4.600 C
KRK mung-1	21.70 A	7.600 BCDE	47.00	10.30 A	4.300 CD
NFM 3-3	15.00 DEFG	9.100 A	47.00	8.300 B	6.230 A
Ramzan	15.00 DEFG	8.100 BC	43.66	8.700 B	6.000 A
LSD	**2.740**	**0.8101**	**ns**	**1.404**	**0.5003**

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 **	KRK mung-1 (21.66) - AEM (10.66)
Number of pods plant^{-1}	156.22 ^{ns}	Mung-88 (58.66) - NM-98 (32.66)
Pod length (cm)	1.169 **	NFM 3-3 (9.06) - NM 28 (6.43)
Number of seeds pod^{-1}	1.110 **	KRK mung-1 (10.06) - Mung-88 (7.66)
100-seeds weight (g)	1.963 **	NFM 3-3 (6.23) - Mung-88 (3.90)
Seed yield plant^{-1}	9.62 **	NM 28 (13.33) - NFM 3-3 (7.33)

** Highly significant differences

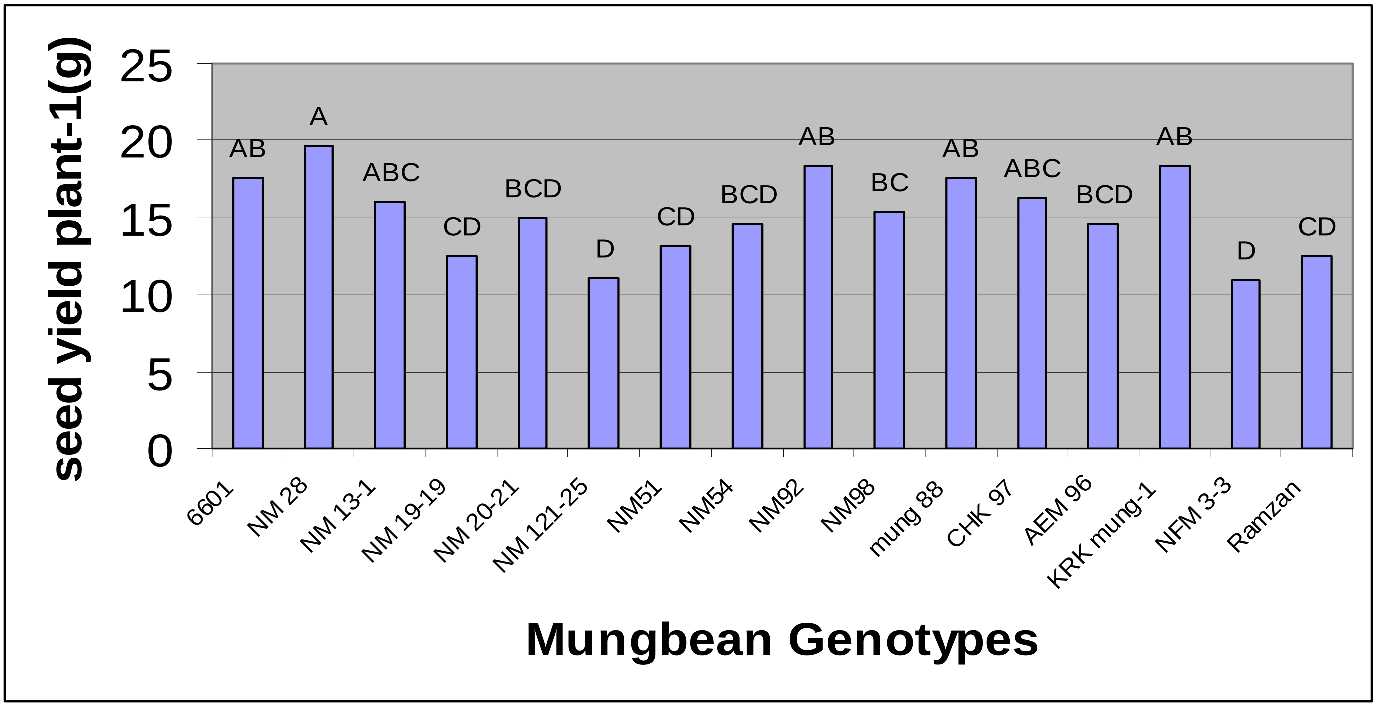

Figure-1. Means values of 16 mungbean genotypes for seed yield plant^{-1}.
LSD value: 10.15

CONCLUSION AND RECOMMENDATIONS

The present experiment was conducted to evaluate the performance of mungbean genotypes under climatic conditions of Peshawar valley. Significant variations were observed for all the parameters except number of pods plant^{-1}. Genotype KRK mung-1 produced maximum number of leaves plant^{-1} and 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 Peshawar valley.

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