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Studies on the Comparative Yield Potential of Seven Mungbean (*Vigna radiata* L.) Genotypes

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Abstract: The comparative yield potential of seven mungbean genotypes namely; NM-92, NM-89, NM-15-11, NM-49-7, NM-22-5-1, 6153 B-20 and 6173 B-10 was studied under field conditions. The yield components like number of pod bearing branches plant^{-1}, number of pods plant^{-1}, number of seeds pod^{-1} and 100-grain weight differed significantly among all the genotypes. Genotype NM-89 produced maximum grain yield which was, however, statistically similar to those of NM-15-11, NM-22-5-1 and NM-92. Protein contents in grains did not differ significantly among the genotypes.

Keywords: Mungbean, genotypes, yield components, grain yield, protein contents

Introduction

Mungbean (*Vigna radiata* L.) is one the most important conventional pulses grown in Pakistan. It was cultivated on an area of 195.4 thousand hectares with total grain production of 88.9 thousand tonnes giving an average yield of 455 kg ha^{-1} (Anonymous, 1999) which is very less as compared to the yield potential of about 1280 kg ha^{-1} possessed by most of its cultivars (Rehman, 1991). Among the various reasons responsible for its low yield, use of low potential varieties and primitive agro-technology are of primary importance. Mungbean varieties vary in yield and yield components (Sharar *et al.*, 1999). Kalita and Shah (1985) conducted an experiment to compare the performance of 19 mungbean cultivars and obtained the highest seed yield (869 kg ha^{-1}) in PIMS-1 and the lowest in cv 11/99 (522 kg ha^{-1}). The 100-seed weight was obtained maximum in Gujrat-2 (3.9 g) and minimum in ML-131 (2.4 g).

Ahmed *et al.* (1992) compared the yield attributes of eight mungbean varieties and reported significant differences among them with regard to number of pods plant^{-1}, number of seeds pod^{-1}, 100-seed weight, seed yield ha^{-1} and protein contents. Similarly, Phogat and Singh (1992) reported that in a field experiment on nine numgbean cultivars, MH-309 produced maximum yield followed by PDM-54 and ML-331 while cv. PDM-14 produced the lowest seed yield. Laprade Coto (1994) compared 19 mungbean hybrids for 1000-seed weight and obtained best yield performance by VC 3178A and VC 2778A. Barman *et al.* (1994) tested mungbean genotype SG 1 in the summer and kharif seasons with three control varieties. SG 1 produced seed yields of 1321 kg ha^{-1} compared with 1135, 1030 and 900 kg ha^{-1} for ML 131, AAU 34 and AA 39, respectively, in the summer and 1362 vs. 1198, 712 and 770 kg ha^{-1} in kharif. SG 1 was released under the name Pratap. Its seeds are medium in size and have a 1000-seed weight of 35-37 g. Ayub *et al.* (1999) obtained higher seed yield of mungbean cultivar NM-92 than NM-54 due to higher number of pod bearing branches plant^{-1}, number of pods plant^{-1} and number of seeds pod^{-1}. The protein contents were also greater in NM-92 than NM-54.

After having known about the variable varietal behavior the present study was, therefore, undertaken to compare the yield performance of seven mungbean genotypes with a view to determine the best adopted genotype under agro-ecological conditions of Faisalabad.

Materials and Methods

Varietal performance of mungbean was studied at the Agronomic Research Area, University of Agriculture, Faisalabad. Experiment was laid out in randomized completed block design with four replications and net plot size measured 1.5 m x 5.0 m. The mungbean genotypes included in the experiment were NM-92, NM-89, NM-15-11, NM-49-7, NM-22-5-1, 6153 B-20 and 6173 B-10. Crop was sown in 30 cm apart rows with the help of a single row hand drill in the last week of July, 1998. A basal dose of N and P_2O_5 at 20 and 50 kg ha^{-1} in the form of Urea and Triple Super phosphate, respectively was side drilled along the seed rows. All other cultural practices were kept uniform for all the treatments. Crop was harvested during third week of October, 1998. Observations were recorded on number of pod bearing branches plant^{-1}, number of pods plant^{-1}, number of seeds pod^{-1}, 100-seed weight and seed yield (kg ha^{-1}) using standard procedures. The protein contents in seeds were determined by using Gunning and Hibbard's method of H_2SO_4 digestion and using micro Kjeldahl method for distillation (Jackson, 1962). The data were analyzed by applying Fisher's analysis of variance technique and least significant difference test was employed at 0.05 probability to compare the differences among treatment means (Steel and Torrie, 1984).

Results and Discussion

All the genotypes produced significantly different number of pod bearing branches plant^{-1} (Table 1). The genotype NM-89 produced maximum number of pod bearing branches plant^{-1} which were, however, statistically similar to that of 6153 B-20. Genotypes NM-49-7 and 6173 B-10 produced statistically similar number of pod bearing branches plant^{-1} which in turn did not differ significantly from those of NM-89, 6153 B-20 and NM-15-11. The number of pod bearing branches plant^{-1} produced by NM-15-11 did not differ significantly from that of NM-22-5-1 which in turn was statistically similar to that of NM-92 which produced the lowest number of pod bearing branches plant^{-1}. The results are in quite in line with those of Ayub *et al.* (1999) who had also reported significant differences among the mungbean cultivars for number of pod bearing branches plant^{-1}. Significant differences were recorded among the mungbean genotypes for number of pods plant^{-1}. The genotype NM-89 produced maximum number of pods plant^{-1} which were statistically similar to those of NM-49-7 which in turn, however, did not differ significantly from the number of pods plant^{-1} produced by 6153 B-20, NM-92 and NM-22-5-1. Significantly lowest number of pods plant^{-1} were produced by 6173 B-10 and NM-15-11 which were, however, statistically similar to those of 6153 B-20, NM-92 and NM-22-5-1.

Table 1: Yield parameters of mungbean genotypes

Genotypes	No.of pod bearing branches plant^{-1}	No.of pods plant^{-1}	No.of seeds pod^{-1}	100-seed weight(g)	Grain yield (kg ha^{-1})	Protein contents (%)
NM-92	3.45 d	10.70 bc	7.60 d	5.21 b	1166.67 a	24.61^{NS}
NM-89	4.73 a	10.50 a	9.87 ab	3.51 d	1270.67 a	24.34
NM-15-11	3.95 bc	10.05 c	9.15 bc	5.27 b	1268.89 a	24.37
NM-49-7	4.40 ab	13.25 ab	8.79 c	4.52 c	833.34 b	23.93
NM-22-5-1	3.83 cd	10.45 bc	10.31 a	5.41 a	1243.33 a	24.88
6153 B-20	4.43 a	12.00 bc	8.72 c	4.62 c	633.33 b	24.22
6173 B-10	4.38 ab	9.65 c	8.98 c	5.07 b	666.65 b	24.61

Any two means not sharing a letter in common differ significantly at 5% probability level

Significant differences among the cultivars for number of pods plant^{-1} have also been reported by Ahmed *et al.* (1992).

All the genotypes produced significantly different number of seeds pod^{-1} (Table 1). Maximum number of seeds pod^{-1} were recorded in NM-22-5-1 which were, however, statistically similar to that of NM-89 which in turn did not differ significantly from that of NM-15-11. The genotypes 6173 B-10, NM-49-7 and 6153 B-20 produced statistically similar number of seeds pod^{-1} which also did not differ significantly from that of NM-15-11. NM-92 produced the lowest number of seeds pod^{-1}. Significant differences in number of seeds pod^{-1} among mungbean genotypes were also reported by Ahmed *et al.* (1992) and Ayub *et al.* (1999). Significant differences were also recorded among the genotypes for 100-seed weight. NM-22-5-1 produced significantly highest 100-seed weight. Genotypes NM-15-11, NM-92 and 6173 B-10 produced statistically similar 100-seed weight. They were followed by 6153 B-20 and NM-49-7 genotypes which produced statistically similar 100-seed weight. The lowest 100-seed weight was recorded in NM-89. The results are in accordance with those of Kalita and Shah (1985) who also reported significant differences in the 100-grain weight of mungbean genotypes.

Significant differences among mungbean genotypes were also recorded for seed yield (Table 1). Maximum seed yield was found in NM-89 which, however, did not differ significantly from that of NM-15-11, NM-22-5-1 and NM-92. These were followed by NM-49-7, 6173 B-10 and 6153 B-20 genotypes which produced statistically similar seed yield. The results are similar to the findings of Phogat and Singh (1992) who also found a significant difference in seed yield of mungbean genotypes.

The quality of mungbean crop is determined by protein contents in its grains. It is evident from the table that all the genotypes produced statistically similar protein contents. Maximum protein contents were produced in NM-22-5-1 while minimum in NM-49-7. These results are contradictory to the findings of Ahmed *et al.* (1992) and Ayub *et al.* (1999) who reported significant differences in the protein contents of mungbean genotypes.

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