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Comparative Efficiency of Different Mungbean Genotypes under Agro-Climatic Conditions of Bhakhar

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Abstract

A field trial to compare the growth and yield performance of some new genotypes of mungbean namely NM-98, C6/94-4-15, C2/94-4-43, C9/94-4-3, C1/94-4-45, C1/94-4-12, C1/94-4-26 and C1/94-4-260, was conducted at the Arid Zone Agriculture Research Institute Bhakkar. The maximum seed yield was produced by C1/94-4-45 due to more number of pods plant^{-1}, number of seeds plant^{-1} and 1000-seed weight. Based on the present findings it is recommended that the C1/94-4-45 genotype should be cultivated for higher seed yield under the agro-ecological conditions of Bhakkar.

Key words: Mungbean, Genotypes, Yield.

Introduction

Mungbean is an important pulse crop that can be grown twice a year i.e. in spring and autumn. Its seed contain 24.2% protein, 13% fat and 60.4% carbohydrates (Considine, 1982). Mungbean is grown over an area of 219.20 thousand hectares with an annual production of 104.5 thousand tones and an average yield of 477 kg ha^{-1} (Anonymous, 2003). This average yield is far below than its potential yield. The use of high yielding genotypes is one of the simplest way to enhance the yield of mungbean on per unit area basis. Mungbean cultivars vary in yield and yield components (Sharar, *et al*., 1999). Ayub *et al*. (1999) reported mungbean genotype NM-92 produced significantly higher yield than NM-54 due to more number of pod bearing branches, number of pods and number of seeds per plant. Similarly, Ali *et al*. (2000) also reported significant differences between mungbean genotypes for yield and yield components. Ali *et al*. (2001) reported that mungbean cultivar NM-98 gave significantly higher seed yield than NM-92. However, Khan *et al*. (1999) reported that genotypes did not differ significant from each other. The present study was therefore carried out to find out a higher yielding mungbean genotype under agro-climatic conditions of Bhakkar.

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Materials and Methods

A field experiment was conducted at the Arid Zone Agriculture Research Institute, Bhakkar to compare yield performance of some new genotypes of mungbean (NM-98, C6/94-4-15, C2/94-4-43, C9/94-4-3, C1/94-4-45, C1/94-4-12, C1/94-4-26 and C1/94-4-260). The experiment was laid out in randomized complete block design with a net plot size of 5 x 1.2 m having four replications. The crop was sown in 30 cm apart rows on 30th June in 2001 and 21st June during 2002. The crop was fertilized at the rate of 30 kg N ha^{-1} and 60 kg P_2O_5 ha^{-1} at sowing in the form of urea and triple super phosphate, respectively. All the agronomic practices were kept normal and uniform for all the treatments. Ten plants were selected at random from each plot to measure plant height, number of primary branches, number of secondary branches, pod length, number of pods plant^{-1}, number of seeds pod^{-1} and number of seeds plant^{-1}. Two years pooled data was analyzed statistically by using Fisher's analysis of variance technique and differences among treatment means were compared using least significant difference test at 5 % probability level. (Steel and Torrie, 1984).

Results and Discussion

The data on growth and yield parameters are given in Table 1.

All genotypes varied significantly for number of days to flowering. The genotype C9/94-4-15 took maximum days to flowering but was statistically at par with NM-98 and C1/94-4-3. The minimum days to flowering were taken by C6/94-4-45 and was statistically at par with C2/94-4-43. The variation in days to flowering might have been a genetically controlled character.

The different genotypes did not vary regarding number of days taken to maturity. The days taken to maturity varied from 82.0 (C1/94-4-26) to 85.50 (C1/94-4-45).

All genotypes have statistically similar number of primary and secondary branches. The maximum and minimum numbers of primary and secondary branches were recorded for C2/94-4-43 and C6/94-4-15, respectively.

The genotype C1/94-4-45 produced significantly taller plants than all the genotypes. The genotype C6/94-4-15 produced the minimum plant height but it was statically similar to C2/94-4-43 and C9/94-4-3. The variation in plant height confirms the fact that the plant height is a genetically controlled character. Significant differences among genotypes for plant height has been reported by Vieria and Nishihara (1992).

Different genotypes showed significant differences for number of pods per plant. The genotype NM-98 produced maximum number of pods per plant and was statistically at par with C1/94-4-45 and C1/94-4-26. The minimum number of pods was produced by C1/94-4-260. The significant differences for number of pods per plant among different genotypes have also been reported by Ali *et al*. (2000 & 2001).

Different genotypes differed significantly for pod length. The maximum pod length was produced by C1/94-4-45 but it was statistically similar to genotypes C9/94-4-4-3, C1/94-4-12 and C1/94-4-26. The smallest pods were produced by C6/94-4-15.

All genotypes have statistically similar number of seeds per pod. Non-significant differences for number of pods per plant has also been reported by Khan *et al*. (1999). However, these results are contradictory to those of Ali *et al*. (2000) who reported significant differences among various mungbean genotypes. These contradictory results might have been due to the variation in genetic traits of the crop plants or fertility status of the soil.

Significant differences were observed among various genotypes for number of seeds plant^{-1}. The genotype C9/94-4-3 produced significantly more number of seeds plant^{-1} than all other genotypes. The minimum number of seeds plant^{-1} were given by C1/94-4-260. The more number of seeds per plant by C1/94-4-45 can be attributed to more number of pods plant^{-1}. Ayub *et al*. (1999) have also reported significant differences among mungbean genotypes for number of seeds per plant.

Different genotypes varied significantly for 1000-seed weight. The maximum 1000-seed weight was produced by C1/94-4-45 but it was statistically similar to the C6/94-4-15, C2/94-4-43, NM-98 and C1/94-4-12. The variation in 1000-seed weight might have been due to variation in the genetic makeup of the genotypes. Ali *et al*. (2000) have also reported significant differences for 1000-seed weight.

Seed yield varied significantly among the different genotypes. The genotype C1/94-4-45 produced significantly higher seed yield than all other genotypes. The increase in seed yield was mainly due to higher number of pods, number of seeds plant^{-1} and 1000-seed weight. Mimber (1995), Ayub *et al*.(1999) and Ali *et al*. (2000 &2001) have also reported significant differences among the mungbean genotypes.

Biological yield also varied significantly by various genotypes. The maximum biological yield was recorded in C1/94-4-45 and was followed by C1/94-4-12. The minimum biological yield was produced by C6/94-4-15 but was statistically similar to C1/94-4-26. The higher biological yield in C1/94-4-45 can be attributed to more plant height and seed yield in this treatment.

Table1: Effect of various genotypes on growth and yield of mungbean.

	NM-98	C6/94-4-15	C2/94-4-43	C9/94-4-3	C1/94-4-45	C1/94-4-12	C1/94-4-26	C1/94-4-260
No. of Days to flowering	39.50 a	39.50 a	35.50 c	37.88 a	34.50 c	38.13 b	38.13 b	38.38 b
No. of days to maturity	83.38	83.11^{NS}	83.13	83.13	85.5	84.63	82	82.502
No. of primary branches Plant^{-1}	1.25^{NS}	1.21	1.31	1.21	1.15	1.25	1.28	1.25
No. of secondary branches Plant^{-1}	3.76^{NS}	3.55	4.03	3.74	3.8	3.59	3.56	3.63
Plant height (cm)	62.63 c	56.53 d	59.05 cd	59.99 cd	86.40 a	75.80 b	63.20 c	62.59 c
No. of pods plant^{-1}	41.76 a	36.91 b	37.94 b	37.95 b	39.91 ab	38.36 b	39.21 ab	32.36 c
Pod length (cm)	8.31 cd	8.17 d	8.54 bcd	9.17 a	9.18 a	9.13 a	8.89 ab	8.36 cd
No. of seeds pod^{-1}	9.7^{NS}	9.46	9.71	9.71	9.64	9.5	9.85	9.36
No. of seeds plant^{-1}	384.73b	367.01 c	373.71 c	368.49 c	405.07 a	364.42 cd	349.17 e	314.22 f
1000 seed weight (g)	5.68 ab	6.05 ab	6.13 ab	5.30 c	6.58 a	5.63 ab	4.69 d	5.29 cd
Seed yield (Kg ha-)	2870 cd	2740 d	3150 b	2776 d	3598 a	2930 c	2600 e	2545 e
Biological yield (Kg ha^{-1})	8876 c	7276 d	8620 c	9048 c	14530 a	10380 b	7306 d	8306 c

Any two means not sharing a letter in common do not differ statistically at 5 % probability.

Conclusion

Based on the present findings it is recommended that the C1/94-4-45 genotype should be cultivated for higher seed yield under the agro-ecological conditions of Bhakkar.

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