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SHORT COMMUNICATION

YIELD PERFORMANCE OF TEN MUNGBEAN GENOTYPES AT MAGURA

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ABSTRACT

With a view to study the performance of summer mungbean genotypes in respect of yield and yield attributes, an experiment was carried out in the experiment field of Bangladesh Institute of Nuclear Agriculture sub-station at Magura during the period from February 2006 to May 2006. The experimental treatment comprised often genotypes *viz.* N4J-207, N4.J-210, N2M-402, EiJ-603, EJ-608, E_2M-511, E_4I-913, Binamoog-5, Binamoog-7 and Barimoog-5. Among the genotypes, last three were widely cultivated varieties and the rest seven were advanced mutants. The experiment was laid out in Randomized Complete Block Design (RCBD) with four replications. The results indicated that the plant height, number of branches plant"[1], TDM plant"[1], number of pods plant"[1], pod length, number of seeds plant"[1], 1000-seed weight, seed yield plant"[1], seed yield m"[2] and harvest index varied significantly among the genotypes. It was observed that the highest plant height (45.53 cm) and maximum number of branches (9.75) were produced by the genotype EjJ-603, but maximum number of pods plant"[1] (25.40) and number of seeds plant"[1] (176.00) were produced by the genotype N4J-207. The genotype Barimoog-5 produced the highest pod length (7.87 cm) and 1000-seed weight (47.00 g). Maximum total dry matter (20.96 g) was produced by the genotype N2M-402. The genotype N4J-207 produced maximum seed yield/plant (6.69 g), seed yield/m^2 and the maximum harvest index (47.67%). The mutant N4J-207 may be released after few more trials in farmers' field for commercial cultivation.

Keywords: yield performance, mungbean genotypes [5]

Mungbean is one of the leading pulse crops in Bangladesh. The agro-ecological condition of Bangladesh is favorable for growing this crop. The crop is usually grown with residual soil moisture. It ranks 3rd in acreage, 5th in production and 3rd in protein content among the pulses grown in Bangladesh (BBS, 2003). In Bangladesh, per capita daily consumption of pulses is only 12 g compared to 45 g per day per capita as suggested by World Health Organization (BARI, 1998) for a balance diet. Malnutrition is a serious health problem in Bangladesh that has been threaten to cripple the whole nation. Pulses constitute the main source of protein for the people, particularly the poor section of Bangladesh. In Bangladesh, pulses are considered to be the poor man's meat, particularly because of its high protein and low price as compared to animal proteins like meat, fish, egg, milk, and milk products. But in recent years area under pulse cultivation is decreasing due to less returns compared to other winter crops like HYV rice, onion, garlic and vegetables. To overcome this situation it has become imperative to extend the cultivation of improved mungbean variety in kharif (summer) season, which can give a reasonable yield. In Bangladesh, there is a possibility of growing mungbean in summer season and some success has already been established (FAO, 1984). It is a short duration crop matures in 65 to 85 days and fits well into many cropping system, including rice and sugarcane under both rainfed and irrigated conditions. It also can be grown with jute or aus rice as intercrop and is also to grow as summer pulse without any tillage. Considering nutritional value, mungbean is, perhaps, the best of all other pulses. The yield of mungbean per plant as well as per unit area is very low. Average yield of mungbean has to be as low as 560 kg ha"[1]. There are many reasons for such low yield (Ahmed *et al,* 1987, Ali and Sheikh, 1987). The varieties grown are genetically low-yield potential and also susceptible to pest and diseases. Lack of high yielding varieties of summer mungbean is one of the major reasons for the low yield. Use of high yielding variety and cultivation of more area can overcome the low yield. Bangladesh Agriculture Research Institute (BARI), Bangladesh Institute of Nuclear Agriculture (BINA) and other organization have developed some varieties of summer mungbean which are high

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yielding but farmers are reluctant to mungbean cultivation for low economic return. So, it is necessary to put up more efforts to improve and increase mungbean production in the country. The present research work has been designed to study different morpho-physiological characteristics responsible for high grain yield of mutants. Considering the above facts this study was taken to achieve the performance of 10 promising genotypes and to select better genotypes based on yield performance and other yield contributing characteristics of mungbean.

With a view to study the performance of summer mungbean genotypes in respect of yield and yield attributes, an experiment was carried out in the experiment field of Bangladesh Institute of Nuclear Agriculture sub-station at Magura during the period from February 2006 to May 2006. The climate of the locality is sub-tropical and is characterized by high temperature and heavy rainfall during kharif season (April to September) and a scanty rainfall associated with moderately low temperature during rabi season (October to March) under AEZ-11. Soil pH value 6.1-7.9 with Silty-Loam soil. The experiment was carried out with three released varieties of summer mungbean namely Binamoog-5, Binamoog-7, Barimoog-5 along with seven advanced mutants *viz.* N_4J-207, N_4J-210, N_2M-402, EjJ-603, E,J-608, E_2M-511 and E_4I-913.The experiment was laid out in Randomized Complete Block Design (RCBD) with four replications. The total number of unit plots was 40. The unit plot size was 4m x 3m. The row to row and plant to plant distances were 30 cm and 10 cm, respectively. Varietal performance was studied by considering 10 important yield and yield contributing characters, viz., plant height, number of branches/plant, number of leaves/ plant, total dry matter/plant, number of pods/ plant, pod length, number of seeds/ plant, 1000-seed weight, seed yield/plant and seed yield/m^2. Land was fertilized with Urea, TSP and MP @ 30g N plot"[1], 60g P_2O_5 plot"[1] and 36g K_2O plot"[1], respectively. After land preparation, seeds were placed by hand at 3 cm depth on 15 February 2006. Weeding was done at 20 and 35 days after sowing. Thinning, weeding, irrigation and plant protection measures were done as per requirements of crops. The crop was harvested on 17 May 2006 when about 80% of the pods become black in color. Data were compiled and analyzed with the help of computer package program MSTAT-C and Duncan's New Multiple Range Test (DMRT).

The results of this study in terms of plant height, the analysis of variance revealed significant differences in plant height (Tablel). The mutant E/J-603 produced the tallest plant (45.53 cm) followed by (42.67 cm) obtained from N_4J-207, while mutant E_4I-913 produced the lowest height (34.48 cm). Sinha *et al.* (1996) and Sharma *et al.* (1989) also found similar results while they studied with a number of summer mungbean genotypes. Probably the genetic make up of the genotypes was responsible for the variation in plant height. Number of branches/plant varied significantly among the genotypes. The maximum number of branches per plant (9.75) was found in mutant EjJ-603. The branches/plant produced by E4-913 (6.75) and Binamoog-7 (6.75) were statistically similar. The genotypes E2M-511 produced the lowest number of branches plant"[1] (5.25) (Table 1). The variation in the number of branches per plant was probably due to the genetic make up of the genotypes. The results are in conformity with the findings of Chowdhury *et al.* (1968) and Islam (1983) who reported a significant variation in different genotypes for number of branches per plant. No significant variations among the genotypes were observed in case of number of leaves per plant (Table 1). The results of total dry matter per plant were presented in Table 2. The mutant NiM-402 accumulated the highest dry matter per (20.96g). The mutant E2M-511 produced the lowest dry matter (11.90 g plant"[1]) (Table 2). Similar results were obtained by Mahmud (1997) but differed from that of Mazumder (1998) who observed that different varieties produced statistically similar dry matter. The genotypes of summer mungbean showed significant differences in harvest index. The highest harvest index (47.67%) was found in mutant N4J-207 which was statistically identical to N4.J-210 and E2M-511. The lowest harvest index (26.26%) was obtained from the mutant N2M-402 (Table 2). These results are consistent with the result of Aguilar and Villareal (1989). They stated that harvest index differed significantly among the genotypes.

The analytical values of pods number/plant were presented in (Table 3). The mutant N_4J-207 produced the highest pods/plant (25.40) followed by mutant E4I-913 (23.80) and (21.60) was recorded in EiJ-603. The lowest number of pods/plant (10.65) was noticed in Binamoog-7 (Table 3). The significant variation in the number of pods/plant was reported by Ram *et al.* (1997) from a study, during kharif season in India.

Table1. Performance of mungbean genotypes on some morphological characters

Genotypes	Plant height (cm)	Number of branches plant^{-1}	No. of leaves plant^{-1}
N_4J-207	42.67 b	7.25 b	11.40
N_4J-210	39.71 c	8.75 a	11.10
N_2M-402	42.02 b	7.00 b	11.25
E,J-603	45.53 a	9.75 a	11.90
EiJ-608	37.75 d	6.00 be	12.45
E_2M-511	35.07 e	5.25 c	14.50
E_4I-913	34.48 e	6.75 b	11.45
Binamoog-5	39.38 c	9.00 a	9.20
Binamoog-7	41.40b	6.75 b	9.95
Barimoog-5	38.43 cd	6.25 be	11.90
Level of significance	0.01	0.01	NS
CV(%)	2.17	11.76	-

In a column, figure having similar letter(s) or without letter do not differ significantly, whereas figures bearing dissimilar letter differ significantly by DMRT at 5% level of significanc

Table 2. Performance of mungbean genotypes on total dry matter production and partitioning

Genotypes	TDM plant^{-1}	Harvest index (%)
N_4J-207	14.04 e	47.67 a
N_4J-210	13.10f	46.22 ab
N_2M-402	20.96 a	26.27 f
EiJ-603	17.26c	34.56 de
E,J-608	12.25 g	41.30 be
E_2M-511	11.90g	45.53 ab
E_4I-913	19.91 b	30.96 ef
Binamoog-5	14.87 d	33.75 de
Binamoog-7	17.52 c	35.48 de
Barimoog-5	14.70 d	39.06 cd
Level of significance	0.01	0.01
CV(%)	2.73	9.23

In a column, figures having similar letters) or without letter do not differ significantly, whereas figures bearing dissimilar letter differ significantly by DMRT at 5% level of significance

These results are also consistent with the findings of Singh and Singh (1995) and Malik *et al.* (1987) respectively. Again the genotypes differed significantly in respect of pod length (Table 3). The longest pod was produced by Barimoog-5 (7.87 cm) which was statistically similar to Binamoog-5 (7.75 cm). In contrast, the genotypes EiJ-608 produced the shortest pod (6.12 cm). The probable reason of difference in pod length is the genetic make up of the genotypes, which was primarily influenced by heredity. Rajeswary and Kamalam (1999) stated that pod/plant, seeds/pod and pod length were most important characters for yield improvement in green gram. The results showed that genotypes had a significant effect on the number of seeds/plant (Table 3). The mutant N_4J-207 produced the maximum number of seeds/plant (176.00) followed by the mutant EiJ-603 (132.25). The minimum seeds/plant (82.00) was obtained from the mutant Barimoog-5. The differences in the number of seeds/plant might be due to the genetic make up of the genotypes. Similar results were also found by Wu *et al.* (1995), Gill *et al.* (1975) and Kansagra *et al.* (1993) who observed that number of pods/plant significantly varied in 15 mungbean genotypes.

The analytical values of 1000-seed weight was significantly influenced by the genotypes (Table 3). Barimoog-5 gave the highest 1000-seed weight (47.00 g) followed by (44.25 g) obtained from N4J-207. The mutant E2M-511 produced the lowest 1000-seed weight (29.35 g). This result corroborates with the results of Farag (1995). Similar results have also been reported by Patil and Deshmukh (1988) respectively.The 1000-seed weight was an inherent character which was not usually affected by environment changes unless the change is extreme. So, 1000-seed weight of mutants and check varieties was their inherent genotypic character which expressed phenotypically. The results of seed yield/plant of summer mungbean varied significantly among the genotypes (Table 3). The mutant N4J-207 produced the highest seed yield/plant (6.69 g) which was superior to other genotypes. The lowest seed yield/plant (5.02 g) was recorded in Binamoog-5. The variation in seed yield/plant could be attributed mainly due to the number of pods/plant (Upadhaya *et al.,* 1980). Singh and Malhotra (1970) studied 75 indigenous and exotic strains of mungbean and found significant variation in yield plant"^{1}. The results were also in agreement with the findings of Han-Fenxia *et al.* (1998) and Reddy (1997).

Table 3. Performance of summer mungbean genotypes on yield attributes and yield

Variety	No. of pods plant"^{1}	Pod length (cm)	No. of seeds plant^{1}	1000-seed weight (g)	Seed yield plant"^{1} (g)	Seed yield m^{2} (g)
N$_4$J-207	25.40 a	6.35 b	176.00 a	44.25 ab	6.69 a	85.06 a
N$_4$J-210	15.00 be	6.85 b	100.75 b	36.45 b	6.05 ab	77.42 c
N$_2$M-402	13.85 be	6.55 b	104.25 b	35.80 b	5.508 be	81.96abc
EJ-603	21.60ab	6.27 b	1 32.25 ab	30.32 b	5.96ab	82.35 abc
EiJ-608	18.25abc	6.12 b	1 04.75 b	33.95 b	5.06c	65.20 d
E$_2$M-511	19.75 ab	6.35 b	126.50 ab	29.35 b	5.42 be	62.17 d
E$_4$I-913	23.80 a	6.20 b	126.50 ab	33.60 b	5. 66 be	60.93 d
Binamoog-5	17.30abc	7.75 a	11 8.00 b	40.45 ab	5.02 c	83.46 a -
Binamoog-7	10.65 c	6.50 b	104.25 b	34.45 b	6.21 ab	82.48 ab
Barimoog-5	14.00 be	7.87 a	82.00 b	47.00 a	5.75 be	81.31 abc
Level of significance	0.01	0.01	0.05	0.05	0.05	0.01
CV(%)	7.64	8.86	10.26	4.15	8.97	4.10

In a column, figures having similar letter(s) or without letter do not differ significantly, whereas figures bearing dissimilar letter differ significantly by DMRT at 5% level of significance.

Significant variation was observed in seed yield per m^2 among the studied genotypes (Table 3). The highest seed yield (85.06g m^2) was provided by N$_4$J-207 which was superior to other genotypes. The lowest yield (60.93 g m^2) was produced by the mutant E4-913. Byregowda *et al.* (1997) and Sandhu *et al.* (1979) reported significant variations for seed yield in mungbean genotypes. From the above results, it may be concluded that N$_4$J-207 performed the best regarding all yield attributes and yield. However, to make a definite conclusion regarding the performance of the mutants, more trials are needed at different agro-ecological zones of Bangladesh before recommending for large-scale cultivation in summer season.

REFERENCES

Aguilar, E.A. and Villareal, R.L. 1989. Evaluation of the yield stability of promising mungbean selections under different growing environments. The Philippine Agriculture, 72(3): 255-269.

Ahmed, Z.U., Shaikh, M.A.Q. and Razzaque, M.A. 1987. Bangladesh Assoc. Advan. Sci. Dhaka. *In*: Proc. 12th Annual Bangladesh Sci. Conf. Section 1. Dhaka, BAAS, p. 13.

BARI (Bangladesh Agricultural Research Institute). 1998. Mungbean cultivation in Bangladesh (Bangladesh-A-Moog Dhaler Chash). BARI, Joydebpur, Gazipur, pp. 11-16.

BBS. 2003. Statistical Year Book of Bangladesh Bureau of Statistics. Statistics Division, Ministry of

Chowdhury, J.B., Kumar, R., Bhat, P.N. and Kakar, S.N. 1968. Evaluation of some exotic and indigenous varieties of *Phaseolus aureus* for characters of economic importance. *J. Res. Punjab Agric. Univ.*, 5 (4): 463-470.

FAO (Food and Agriculture Organization). 1984. Mungbean, A Guide Book on Production of Pulses in Bangladesh. FAO Project Mannual, Khamar Ban, Farm Gate, Dhaka. p. 27.

Gill, K.S., Sandhu, T.S., Singh, K., Bras, J.S. and Singh, K. 1975. Evaluation of mungbean *(Vigna radiata* L. Wilczek) germplasm. Punjab Agric. Univ., India, Crop Improvement. 2(1-2): 99-104.

Fenxia, H., Guiying, L., Ban, F.X. and Gy, L. 1998. Correlation analysis between main agronomic traits in mungbean. Acta. Agril. Boreail Sinica, 13(4): 66-69.

Islam, M.Q. 1983. Development of some photoneutral varieties of mungbean for summer and winter cultivation in Bangladesh. *Bangladesh J. Agril. Res.*, 8 (1):7-16.

Kansagra, U.M. and Sukla, P.T. 1993. Variability studies in induced mutants in mungbean. *Madras Agril. J.*, 80(4): 180-184.

Mahmud, M.S. 1997. Growth, yield and quality of mungbean as influenced by sowing environment. M.Sc. Ag. Thesis. Dept. of Agron. Bangladesh Agril. Univ., Mymensingh. pp. 52-63

Malik, B.A., Tahir, M., Khan, L.A., Zubair, M. and Choudhary, A.H. 1987. Genetic variability, character correlation and path analysis of yield components in mungbean *(Vigna radial a* L. Wilcrek). *Pakistan J. Bot.*, 19(1): 89-97.

Mazumder, S.N. 1998. Effect of Nitrogen and rhizobial biofertilizer on the varieties of mungbean. M. Sc. Ag. Thesis. Dept. Agron. Bangladesh. Agril. Univ., Mymensingh, pp. 32-44.

Patil, H.S. and Deshmukh, R.B. 1988. Correlation and path coefficient analysis in mungbean. *J. Maharastra Agril. Univ.*, 13(2): 183-185.

Rajeswari, A. and Kamalam, N. 1999. Genetic study of yield and yield components in greengram *(Vigna radiata* L. Wilckzek) under partially shaded coconut orchard. Legume Res. 22(4): 237-240.

Ram, S.G., Rojkumar, R., Nayagam, P.G. and Rathnaswamy, R. 1997. Variability and association of yield components in greengram. *Madras Agril. J.*, 84(8): 469-470.

Reddy, K.H.P. 1997. Genetic variability in green gram *(Vigna radiata* L. Wilczek) Ann. Agril. Res. 18(4): 554-555.

Sandhu, T.S., Bullar, B.S., Cheema, H.S. and Gill, A.S. 1979. Variability and inter relationships among grain protein, yield and yield components in mungbean. *Indian J. Genet. Plant Breed.*, 39(3): 480-484.

Sharma, M.L., Bharadwaj, G.S., Chauhan, Y.S., Sharma, S.D. and Sharma, M.S. 1989. Response of greengram to sowing dates under rainfed conditions. *Indian J. Agron.*, 34(2): 252-254.

Singh, A. and Singh, K.P. 1995. Pattern of variability expression among mungbean genotypes having differential photothermal responsiveness. *Haryana Agril. Univ. J. Res.,* 25 (4): 155-161.

Upadhaya, L.P., Singh, R.B. and Agarwal, R.K. 1980. Character association on greengram populations of different maturity groups. *Indian J. Agric. Sci.,* 50(6): 73-476.

Wu, J.J., Hao, X.X., Hiang, H.L. and Wu, J. 1995. Analysis of high yield genotype features in summer soybean. Soybean Sci. 14(1): 1-63.