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Correlation Studies on Morphological and Yield Characters of Mungbean (*Vigna radiata* L.Wilczek)

Rajendra Kumar Dangi[1*], Deshraj Gurjar[1], P. B. Singh[1] and G. Roopa Lavanya[2]

[1]Department of Plant Breeding & Genetics, RCA (MPUAT), Udaipur-313001
[2]Department of Genetics and Plant Breeding, Allahabad School of Agriculture, SHIATS, Allahabad-211007, Uttar Pradesh, India
E-mail: deshraj.agri@gmail.com

Abstract

The present study was conducted to determine correlation among different yield contributing traits of mungbean, at SHIATS Allahabad, during Kharif 2013.Significant differences were observed among different populations for all the parameters. The highest GCV and PCV were observed for seed yield per plant. High estimates of heritability were observed for Days to maturity, plant height, seed yield per plant and pod length. Genetic advance as 5% of mean was found maximum for seed yield per plant followed by pod length and plant height. Correlation analysis revealed that days to 50% flowering was found to have positive correlation with number of primary branches per plant and plant height while it is found negatively correlated with clusters per plant and days to maturity. Seed index showed positive correlation with pod length while it was found negatively correlated with number of seeds per pod. Seed yield was found to be non-significantly positively correlated with days to 50% flowering, pod length, seed index and negatively non-significantly correlated number of seeds per pod.

Key words: *Mungbean, variability, correlation, heritability, genetic advance.*

Introduction

Improvement of Mungbean [*Vigna radiata* (L.)wilczek], being important pulse crop of India, is an important task for pulses breeders. Development of improved varieties with more genetic potential will increase yield to a greater extent. A huge amount of diversity is present worldwide to be exploited by mungbean breeders. Variation does exist among different mung populations[3]. Which can be used for improvement. As the genetic variability present in the cultivated mungbean lines is less, the identification of diverse parents is of utmost important. Selection of superior parents exhibiting better heritability and genetic advance for various characters is an essential prerequisite for any yield improvement programme[7]. The efficiency of selection will increase, if the nature and magnitude of inter-relationship among component character and seed yield is understood. Present study was conducted to know amount of variability present in the germplasm and the association of different yield attributing characters with seed yield so that they can be used directly or indirectly in the selection for improvement of the crop.

Materials and Methods

The experimental material for the present investigation consisted 22 genotypes *viz.*, RMG-268,RMG-344, RMG-492**,** RMG-975RMG-976**,** RMG-1004**,** RMG-1010**,** RMG-1014**,** RMG-1023RMG-1030**,** RMG–1037**,** RMG–1052**,** RMG–1062**,** RMG–1063**,** IPM02–03**,** GANGA-8**,** G-4**,** MH-521**,** MSJ-118**,** SML-668**,** MUM-2 and Samrat (check).The experiment was carried out at Field Experimentation Centre, Department of Genetics and Plant Breeding, Allahabad during *Kharif,* 2013 in randomized block design in three replication. Recommended cultural practices were followed to raise

healthy crop. Five competitive plants from each genotype were randomly selected for recording observations on ten characters *viz*., days to 50% flowering, plant height (cm), number of primary branches per plant, number of clusters per plant, number of pods per plant, days to maturity, pod length (cm), number of seeds per pod, seed index (g), seed yield per plant (g). The mean values were used to obtain analysis of variance. PCV and GCV were calculated by the formula given in the literature[4]. Heritability in broad sense (h2)[4,5] and genetic advance was calculated. Correlation coefficient was worked out as method suggested in the past[2].

Results and Discussion

The analysis of variance showed significant differences among genotypes for all the characters under study, indicating the presence of genetic variability among the genotypes and revealing the scope for selection of suitable parents for future hybridization and yield improvement in mungbean. The high range of variation were recorded for plant height and days to 50% flowering indicating maximum scope for the selection of these characters for effective improvement. A perusal of GCV revealed that maximum value of genotypic coefficient of variation was recorded for seed yield per plant (17.39). Lowest GCV was observed for days to 50% flowering (2.54) (Table 1). The PCV for seed yield per plant (17.80) exhibited. While estimates of PCV were low for days to maturity (2.97). The high difference between phenotypic coefficient of variation and genotypic coefficient of variation for seed index, days to 50% flowering, number of clusters per plant and number of primary branches per plant indicates these characters were highly influenced by environment. Heritability specifies the proportion of the total variability that is due to genetic causes. It is a good index to know the ability of parents to transfer different characters to their offspring. In the present study heritability was found to be high for days to maturity (97%) followed by plant height (95%), number of primary branches per plant (95%), pod length (72%) and number of pods per plant (70%) while moderate heritability was estimated for remaining characters. The characters exhibited high heritability, suggested that the selection will be more effective and they are least affected by environment.

The estimate of genetic advance expressed as percentage of mean showed a wide range for 3.48 for days to 50% flowering and 34.98 for seed yield per plant (Table 1). High heritability coupled with high genetic advance (as percent per mean) was recorded for seed yield per plant while high heritability coupled with moderate value of genetic advance was observed for plant height and pod length while low estimates heritability coupled with low estimates of genetic advance (as 5% percent of mean) was recorded for rest of the characters confirming the work of earlier investigators[1, 6, 8, 9].

High heritability (broad sense) associated with high genetic advance expected in the next generation recorded for plant height, seed yield per plant and pod length suggested that these characters are governed by additive genetic effect to a great extent and improvement of these characters would be effective through phenotypic selection.

Genotypic correlation coefficient analysis revealed that seed yield per plant registers non significant correlation with all the studied characters (Table 2). It shows positive correlation with days to 50% flowering, pods per plant, pod length, seed index and number of pods per plant while it records negative correlation with Days to 50% flowering showed positive significant correlation with number of primary branches per plant and negative significant correlation with number of clusters per plant. Number of seeds per pod was found negatively correlated with number of pods per plant. Seed index was found positively significantly correlated with pod length. A positive value of correlation shows (Table 3) that the changes of two variables are in the same direction, *i.e.,* high value of one variable are associated with high values of other and vice-versa. Thus selection can be composed on those characters showing positive correlation with seed yield/plant.

Table 1 Estimation of genetic parameter for morphological characters in mungbean germplasm

S. No.	Characters	Coefficient of variation		h^2 (bs) %	Genetic advance	Genetic advance as % of mean
		Genotypic	Phenotypic			
1	Days to 50% flowering	2.54	3.80	44	1.46	3.48
2	Number of primary branches/ plant	5.90	8.05	53	0.48	8.88
3	Number of pods/ plant	4.66	5.53	70	0.01	8.07
4	Number of clusters/ plant	5.09	7.39	47	0.38	7.21
5	Plant height	5.76	5.88	95	6.50	11.61
6	Days to maturity	2.93	2.97	97	3.89	5.95
7	Number of seeds per pod	3.61	4.96	53	0.62	5.40
8	Pod length	7.67	8.99	72	0.97	13.45
9	Seed index	5.89	9.00	42	0.23	7.93
10	Seed yield/ plant	17.39	17.80	95	1.97	34.98

Table 2 Estimates of correlation coefficient at genotypic level for component characters with seed yield in mungbean

Character	Day to 50% Flowering	Primary Branches/ Plant	Pods/ Plant	Clusters/ Plant	Days to Maturity	Seeds / Pod	Pod Length	Seed Index	Seed Yield/ Plant
Plant Height (cm)	0.16*	0.21	-0.04	-0.22	0.23	0.20	0.0030	-0.03	-0.15
Day to 50% Flowering	1.00	0.65**	0.13	-0.34**	-0.29	0.18	0.18	0.23	0.15
Primary Branches/ Plant		1.00	0.67	0.29*	-0.02	-0.13	-0.06	-0.053	-0.16
Pods/ Plant			1.00	0.13	0.11	-0.36**	-0.23	-0.026	0.11
Clusters/ Plant				1.00	0.44**	-0.057	0.11	-0.23	0.08
Days to Maturity					1.00	-0.100	-0.45**	-0.03	-0.04
Seeds / Pod						1.00	0.1	-0.54**	-0.14
Pod Length cm							1.00	0.70**	0.30
Seed Index								1.00	0.17

Table 3 Estimates of correlation coefficient at phenotypic level for component characters with seed yield in mungbean

Character	Day to 50% Flowering	Primary Branches/ Plant	Pods/ Plant	Clusters/ Plant	Days to Maturity	Seeds / Pod	Pod Length cm	Seed Index	Seed Yield/ Plant
Plant Height (cm)	0.084	0.158	-0.034	0.174	0.225	0.117	-0.026	-0.053	-0.144
Day to 50% Flowering	1.000	0.357**	-0.049	-0.085	-0.222	0.073	0.138	0.220	0.072
Primary Branches/ Plant		1.000	0.407**	0.222	-0.0320	-0.064	-0.124	-0.133	-0.082
Pods/ Plant			1.000	0.104	0.109	-0.127	-0.186	-0.089	0.101
Clusters/ Plant				1.000	0.298*	-0.077	0.066	-0.209	0.046
Days to Maturity					1.000	-0.118	-0.377**	-0.025	-0.039
Seeds / Pod						1.000	0.071	-0.323**	-0.124
Pod Length cm							1.000	0.463**	0.207
Seed Index								1.000	0.085

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