IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 10, Iss 01, 2021

ASSOCIATION OF TRAITS AMONG MUNGBEAN GENOTYPES (*VIGNA RADIATA* L. WILCZEK) BASED ON MORPHOLOGICAL MARKERS

Suhel Mehandi[1]*, Aneeta Yadav[1], G. Roopa Lavanya[2] and Sudhakar Prasad Mishra[3]

[1 *] *Faculty of Agriculture and Allied Industries, Rama University, Kanpur, Uttar Pradesh, India*

[2] *Faculty of Agriculture, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Uttar Pradesh, India*

[3] *Faculty of Agriculture, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidhyalaya, Chirakoot, Satna, Madhya Pradesh, India*

ABSTRACT

The present study consists of 21 mungbean genotypes that were evaluated *Kharif* 2010-11 to study and 11 yield associated traits. The analysis of variance revealed statistically significant differences ($p<0.05$) indicating the existence of genetic variability among the 21 genotypes for all the traits studied. Among all the characters studied, 100-seed weight showed positive and significant correlation with seed yield per plant. Correlation results indicated that number of pods/plant and grain yield were highly significantly and positively correlated with each other. This strong relationship between these two characters revealed that pod number is most important component and directly proportional to crop yield. Increase in number of pods per plant will also increase the grain yield and vice versa. Plant height exhibited negative significant correlation with days to maturity but number of primary branches per plant, number of clusters per plant, number of pods per plant and pod length registered positive non-significant correlation, while number of seeds per pod, seed index and seed yield per plant registered negative non-significant correlation.

Keywords: Mungbean, Genotypes, Correlation, genetic variability.

INTRODUCTION

Mungbean [*Vigna radiata* L.Wilczek] is an important protein rich pulse crop produced globally, with high nutritional and economic value. Estimation of the genetic variation is key to any crop improvement program. Mungbean is an annual food legume. It is one of the important crop well suited to dry areas and mainly irrigated conditions. It is cultivated traditionally by small landholders throughout tropical, subtropical and temperate zones of Asia including India, Pakistan, Bangladesh, Sri Lanka, Nepal, Thailand, China, Korea and Japan. Since, it has a short maturity span (60-75days). Mungbean is grown under various cropping system. Hence, contributing to the increase of the small land holder's income as well as to the improvement of the soil conditions (Fernandez and Shanmungasundarm, 1988). In South Asia, mungbean is used to make dall. Dall is the most common dish which is made from various kinds of split legumes. In South-East and East Asian country, it is used to make various kinds of sweet, bean jam,

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 10, Iss 01, 2021

sweetened bean soup, vermicelli and bean sprout. Correlation coefficient is the mutual association between variables without implying any cause and effect relationship (Mehandi *et al*. 2019)

MATERIALS AND METHODS

The present investigation was conducted to examine the 21 mungbean genotypes along with one check (Samrat) to study the genetic parameters, correlation and genetic diversity. The experiment was conducted at Field Experimentation Centre, Department of Genetics and Plant Breeding, Sam Higginbottom Institute of Agriculture Technology and Sciences, Allahabad during *kharif* 2010-11 in Randomized Block Design with three replications. Analysis of variance showed highly significant differences among 21 mungbean genotypes for 10 quantitative characters. Correlation coefficient is the mutual association between variables without implying any cause and effect relationship. Simple correlation coefficients were computed at genotypic and phenotypic levels between pair of characters adopting following formulae given by Al- Jibouri *et al.* (1958).

RESULTS

Seed yield per pant exhibited positive and significant correlation with seed index, while days to 50% flowering and days to maturity showed negative significant correlation. Whereas plant height, number of clusters per plant, number of pods per plant and pod length recorded negative non-significant correlation with seed yield. But number of primary branch per plant and number of seeds per pod showed positive non-significant correlation with seed yield.

Days to 50% flowering exhibited positive significant correlation with days to maturity, while seed yield per plant registered negative significant correlation. Number of pods per plant registered positive non-significant correlation, while plant height, number of primary branches, number of cluster per plant and pod length registered negative non-significant correlation. Plant height exhibited negative significant correlation with days to maturity but number of primary branches per plant, number of clusters per plant, number of pods per plant and pod length registered positive non-significant correlation, while number of seeds per pod, seed index and seed yield per plant registered negative non-significant correlation. Primary branches per plant exhibited positive non-significant correlation with seed yield per plant, seed index and pod length, while days to maturity registered negative significant correlation. Number of clusters per plant, number of pods per plant and number of seeds per plant, registered negative non-significant correlation. Number of clusters per plant exhibited positive significant correlation with pods per plant while pod length and number of seeds per pod registered positive non-significant correlation, while days to maturity, 100 seed weight and seed yield per plant registered negative non-significant correlation. Number of pods per plant exhibited positive non-significant correlation with days to maturity, pod length, number seeds per pods and seed yield per plant while seed index showed negative non-significant correlation. Pod length exhibited positive non-significant correlation with number of seeds per pod, seed index and seed yield per plant. Number of seeds per pod exhibited negative non-significant correlation with seed index, while seed yield per plant registered positive non-significant correlation. Days to maturity exhibited negative non-significant correlation with seed index and seed yield per plant. Pod length exhibited negative significant correlation, while number of seeds per pod registered positive significant correlation.

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 10, Iss 01, 2021

DISCUSSION

For selecting a suitable plant type, correlation studies would provide reliable information, extent and direction of selection, especially when the breeder needs to combine high yield potential with desirable agronomic characters and grain quality. In present investigation genotypic correlation coefficient of different characters with seed yield per plant and inter-relationship among themselves were estimated (Table 1 and 2).

Grain yield depends upon the variety, availability of plant nutrients, crop management and its supporting variables either in negative or positive direction. Various genotypes significantly affected the grain yield and all the varieties behaved differently as for as grain production is concerned. Seed yield per pant exhibited positive and significant correlation with seed index, while days to 50% flowering and days to maturity showed negative significant correlation. Positive association of seed yield per plant with seed index was earlier reported by Chakraborthy and Haque (2019), Vikas *et al.* (2016), Rajan *et al*. (2000) and Afiah Muhammad (2000). Whereas plant height, number of clusters per plant, number of pods per plant and pod length recorded negative non-significant correlation with seed yield. But number of primary branch per plant and number of seeds per pod showed positive non-significant correlation with seed yield. These findings are in agreement with Miah and Bhadra (1989) and Reddy *et al.* (1991).

Days to 50% flowering exhibited positive significant correlation with days to maturity, while seed yield per plant registered negative significant correlation. Number of pods per plant registered positive non-significant correlation, while plant height, number of primary branches, number of cluster per plant and pod length registered negative non-significant correlation. Correlation studies between grain yield and number of days taken to maturity given in Table 1 indicated a negatively non-significant association between these two characters, which means that increase in days to maturity will decrease the final grain yield in mungbean. These findings were not supported by Saleem 1982 and Aslam *et al.,* 1992 who observed positive association of grain yield with days to maturity. The difference in results might be due to different genetic makeup of cultivars. Plant height exhibited negative significant correlation with days to maturity but number of primary branches per plant, number of clusters per plant, number of pods per plant and pod length registered positive non-significant correlation, while number of seeds per pod, seed index and seed yield per plant registered negative non-significant correlation. Primary branches per plant exhibited positive non-significant correlation with seed yield per plant, seed index and pod length, while days to maturity registered negative significant correlation. Number of clusters per plant, number of pods per plant and number of seeds per plant, registered negative non-significant correlation. Number of clusters per plant exhibited positive significant correlation with pods per plant while pod length and number of seeds per pod registered positive non-significant correlation, while days to maturity, 100 seed weight and seed yield per plant registered negative non-significant correlation. Number of pods per plant exhibited positive non-significant correlation with days to maturity, pod length, number seeds per pods and seed yield per plant while seed index showed negative non-significant correlation. The differences in pod production by various cultivars of mungbean were also reported by Miah and Bhadra 1989 and Reddy *et al.* 1991. Pod length exhibited positive non-significant correlation with number of seeds per pod, seed index and seed yield per plant. Number of seeds per pod exhibited negative non-significant correlation with seed index, while seed yield per plant registered positive non-significant correlation. Days to maturity exhibited negative non-significant correlation with seed index and seed yield per plant. Pod length exhibited negative significant correlation, while number of seeds per pod registered positive

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 10, Iss 01, 2021

significant correlation. Seed index exhibited positive significant correlation with seed yield per plant. These results are in accordance with Reddy *et al.* (1991) and Naidu *et al*. (1991).

Conclusion

Correlation results indicated that number of pods/plant and grain yield were highly significantly and positively correlated with each other. This strong relationship between these two characters revealed that pod number is most important component and directly proportional to crop yield. Increase in number of pods per plant will also increase the grain yield and vice versa.

Table 1: Estimates of correlation coefficient at genotypic level for nine component characters with seed yield

Characters	DF	PH	PBP	CP	PP	DM	PL	SP	SI	SYP
DF	**1.00**	-0.3334	-0.0407	-0.0223	0.0255	0.6575**	-0.1595	0.3449	-0.4688	-0.3364**
PH		**1.00**	0.2925	0.1480	0.2400	-0.5630**	0.1881	-0.3115	-0.0714	-0.1811
PBP			**1.00**	-0.1867	-0.1187	-0.3694*	0.0862	-0.2571	0.3927	0.0861
CP				**1.00**	0.5811**	-0.1652	0.0082	0.0671	-0.0193	-0.1951
PP					**1.00**	0.0103	0.1415	0.0606	-0.1206	-0.1871
DM						**1.00**	-0.6731*	0.4346*	-0.3269*	-0.1547*
PL							**1.00**	-0.1104	-0.0726	-0.0348
SP								**1.00**	-0.1606	0.1825
SI									**1.00**	0.4339**
SYP										**1.00**

*** & ** Significant at 5% level and 1% level of significance**

Table 2: Estimates of correlation coefficient at phenotypic level for nine component characters with seed yield

Characters	DF	PH	PBP	CP	PP	DM	PL	SP	SI	SYP
DF	**1.00**	-0.2475	0.1135	-0.0492	0.0176	0.4856**	-0.0245	0.1658	-0.4547	-0.2057**
PH		**1.00**	0.1491	0.1298	0.2332	-0.5038**	0.0711	-0.2273	-0.0583	-0.1783
PBP			**1.00**	-0.1200	-0.0846	-0.2717*	0.0024	-0.1911	0.1013	0.1303
CP				**1.00**	0.5722**	-0.1543	0.0139	0.0633	0.0407	-0.1563
PP					**1.00**	0.0093	0.0660	0.0438	-0.1026	-0.1603
DM						**1.00**	-0.3121*	0.2711*	-0.2727*	-0.1702*
PL							**1.00**	-0.0376	0.0250	-0.1325
SP								**1.00**	-0.0623	0.1248
SI									**1.00**	0.3285*
SYP										**1.00**

*** & ** Significant at 5% level and 1% level of significance**

DF=Days to 50 % flowering, PH= Plant height (cm), CP= Clusters/ Plant, PBP=Primary branches/ Plant PP=Pods/ Plant, DM= Days to maturity, PP= Pod length (cm), SP= Seeds/ Pod, SI= Seed index, SYP= Seed yield/ Plant (g)

References

1. Al-Jibouri, HA., Mullar, PA. and Robinson, HF. (1955) Genetics and environmental variances and co-variances in an upland cotton cross inter-specific origin. *Agron. J*. 50: 633-636.
2. Afiah, SAN. and Mohammad, NA. (2000) Integrated analysis of the relative contribution of yield attributing varieties. *Ann. Agril. Res*., 38(3): 1347-1362.
3. Aslam, M., Khan, NA., Mirza, MS. and Khan, AR. (1992) Correlation and path coefficient analysis for yield components in soybean. *Pak. J. Agric. Res.*, 13: 20-25.

ISSN PRINT 2319 1775 Online 2320 7876

4. Chakraborthy, M. and Haque MF. (1999) Inter-relationship of yield and yield attributes. *J. Res. Birsa Agril Univ.*, 11(2): 173-177.
5. Fernandez, GCJ. and Shanmungasundarma, S. (1988) The AVRDC mungbean improvement programme: the past, present and future, in mungabean : Proc. 2nd int. sym. (Eds) pp 58-70.
6. Fisher, RA. and Yates, AH. (1938) Statistical tables for biological, agricultural and medical research. *Olivar and Boyed. Edinburgh*. pp. 134-135.
7. Mehandi, S., Quatadah,SM., Mishra, SP., Singh, IP., Praveen N. and Dwivedi, N. (2019) Mungbean (*Vigna radiata* L. Wilczek): Retrospect and Prospects, Legume Crops - Characterization and Breeding for Improved Food Security, *IntechOpen*, DOI: 10.5772/intechopen.85657.
8. Miah, NN. and Bhadra, SK. (1989) Genetic variability in the F2 generation of mungbean. Bangladesh J. Agric. Res., 14: 72-75.
9. Naidu, NV., Satyanarayana, A. and Gunter, ARL. (1991) Studies on estimation of genetic parameters under different environments in green gram. *Indian J. Pulses Res.*, 4: 19-22.
10. Rajan, REB., Wilson, D., Vijayaraghava, K. and Kumar, V. (2000) Correlation and path analysis in the F_2 generation of green gram (*Vigna radiata* L. Wilczek). *Madras Agri. J.*, 87(2): 590-593.
11. Reddy, TD., Mishra, RK. and Yadav, RK. (1991) Genetic variability and correlation co-efficient related to yield and other quantitative characters and use of path co-efficient in mungbean. *Indian J. Pulses Res.*, 4: 100-104.
12. Saleem, S.A., (1982) Variation and correlations among agronomic characters in a collection of beans (*Vicia faba*). *J. Agric. Sci.*, 99: 541-545.
13. Vikas., Paroda, RS. and Singh, SP. (1999) Phenotypic correlation and direct and indirect relation of component character with seed yield in mungbean (*Vigna radiata* L. Wilczek) over environment. *Ann. Agril. Res.*, 2(4): 411-417.