Int.J.Curr.Microbiol.App.Sci (2019) *8*(9): 2252-2255

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 8 Number 09 (2019)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2019.809.259

Genetic Variability, Heritability and Genetic Advance for Yield in Mung Bean [*Vigna radiata* (L.)Wilczek]

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Keywords

phenotypic coefficient variability, genotypic coefficient of variability, genetic advance, heritability.

Article Info

Accepted:
22 August 2019
Available Online:
10 September 2019

A B S T R A C T

Ten greengram genotypes and their 21 F_1s possible cross combinations were evaluated for seven yield and yield attributing traits including yield considerable variability existed for all the traits, the phenotypic and genotypic coefficient of variability (GCV), heritability and genetic advance (GA) were high for seven characters recorded values for heritability among them plant height showed highest heritability followed by Seed yield per plant, Number of pods per plant, Number of branches per plant, Number of clusters per plant, Hundred seed weight (g). High heritability coupled with high genetic advance (GA) as percentage of mean was observed for plant height.

Introduction

Green gram (*Vigna radiata* (L.)Wilczek) is one of the important pulse crops because of its short growth duration, adaptation to low water requirement and soil fertility. It isfavored for consumption due to its easy digestibility and low production of flatulence (Shil and Bandopadhya, 2007). Pulses are extensively grown in tropical regions of the world as a major protein rich crop bringing considerable improvement in human diet. Average protein content in the seed is around 24 per cent. The protein is comparatively rich in the amino acid lysine but predominantly deficient in cereal grains (Baskaran *et al.*, 2009). Presently, the yield of green gram is well below the optimum level compare to other pulses. The average yield of mungbean is very low not only in India (425 kg/ha) but in entire tropical and sub-tropical Asia. Genetic variability studies are an important parameter for identifying key traits that would form a reliable link during selection. Variability studies reveal the extent of genotypic factors controlling the expression of any given trait. Hence, a study was

conducted to identify the traits with desirable genetic variability for future breeding programmes.

Materials and Methods

The experimental material consisted of 21 germplasm accessions of green gram (*Vigna radiata* (L.) Wilczek) obtained from various and maintained at Department of Plant Breeding and Genetics, Annamalai University, Chidambaram. Parent were evaluated in randomized block design with three replication during kharif season. Each genotype was grown in 4-row plots, 6 m long with 30 X 10 cm spacing. The experimental material comprised of ten genotypes of green gram *viz.*, VGG-8, CDM Local, RM8-662, HUM-12, RM8-663, V-3518, Nagalur Local, ADT-2, ADT-3,KM-2. The recommended packages of practices were followed to raise the crop. Data on the basis of five randomly selected competitive plants were recorded on Plant height, Number of branches per plant, Number of clusters per plant, number of seeds per pods, number of pods per plant, hundred grain weight, seed yield per plant.

Results and Discussion

The results obtained under the present investigation are presented in Table 1 and 2. The pooled analysis of variance of four locations revealed significant differences for all seven characters as presented in Table 1. The mean sum of squares due to treatments was found highly significant for all the twelve characters. A wide range of variability was exhibited by most of the traits under the study. The wide range of variation noticed in all the characters would offer scope of selection for desirable types. All the twelve characters under the study exhibited low GCV and PCV difference indicating the inheritance of plant genetic system with minimum influence of the environment. All the seven characters under the study exhibited low GCV and PCV difference hence, reliable. The highest genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) were observed for plant height, number of clusters per plant, number of branches per plant, number of pods per plant, hundred seed weight (g), seed yield per plant (g) while it was moderate for number of seeds per pod(Rohit Yadav *et al.,* 2017). Narrow difference between PCV and GCV values of all these traits indicated the predominance of additive gene effects whereas high PCV and GCV traits are highly preferred for selection. In this study, seed yield per plant (g) (99.2839), number of pods per plant(98.1419), number of seeds per pod(95.3781), number of branches per plant(92.6269), number of clusters per plant (91.4814) and hundred seed weight (88.2684) recorded higher values for heritability hence, highly desirable for selection (Mamata *et al.*, 2018).

The higher values of heritability coupled with high genetic advance as percentage of mean was recorded for the character, seed yield per plant (81.2310) which indicated the role of additive gene action and further reveals that the improvement of such traits is easy through selection. Johnson *et al.,* (1955) have suggested that characters with high heritability coupled with high genetic advance would respond better during selection than those with high heritability and low genetic advance. The character like number of branches per plant(91.4814, 6.4429), number of seed per plant(95.3781, 6.0477)and hundred grain weight(88.2684, 2.5396) recorded, high heritability, with low genetic advance as percentage of mean, revealing the role of non-additive gene action (Paikhomba *et al.*, 2014).

Table.1 pooled analysis of variance for yield and yield components in grengram

Source of variance	df	PH	NCP	NBP	NPP	NSP	HSW	SYP
Replication	**2**	**5.6586**	**2.8068**	**0.0010**	**3.1175**	**0.7988**	**0.1395**	**1.0121**
Treatment	**9**	**4040.9578**	**297.6666**	**42.4781**	**4023.9771**	**247.9264**	**48.5483**	**2567.4119**
Error	**18**	**14.0340**	**17.9226**	**2.1959**	**50.4723**	**7.8821**	**4.1191**	**12.3163**

PH - Plant height (cm), NCP – Number of Clusters per plant, NBP – Number of branches per plant, NPP – Number of pod per plant, NSP – Number of Seeds per pod, HSW – hundred seed weight (g), SYP - Seed yield per plant (g)

Table.2 Estimations of variability parameters for different characters in green gram

Trait/Parameters	Variance		Coefficient of Variance %		Heritability	Genetic Advance	Genetic Advance (% of mean)
	PV	CV	PCV	GCV			
Plant height (cm)	150.1849	149.4052	23.4810	23.4200	99.4809	25.1142	48.1198
Number of clusters per plant	11.6885	10.6928	26.8876	25.7168	91.4814	6.4429	50.6700
Number of branches per plant	1.6546	1.5326	22.7263	21.8725	92.6269	2.4544	43.3644
Number of pods per plant	150.9055	148.1015	36.1446	35.8073	98.1419	24.8356	73.0745
Number of seeds per pod	9.4744	9.0365	18.4972	18.0646	95.3781	6.0477	36.3430
Hundred seed weight (g)	1.9506	1.7218	26.6792	25.0654	88.2684	2.5396	48.5115
Seed yield per plant (g)	95.5455	94.8613	39.7169	39.5745	99.2839	19.9918	81.2310

PH - Plant height (cm), NCP – Number of Clusters per plant, NBP – Number of branches per plant, NPP – Number of pod per plant, NSP – Number of Seeds per pod, HSW – hundred seed weight (g), SYP - Seed yield per plant (g)

High GCV for number of fruits per plant, dry chilli yield per plot, was also reported by Munshi and Behera (2000), Varkey (2001), Gogoi and Gowtam (2002), Tembhurne *et al.*, (2008), Sharma *et al.*, (2010) and Kumar *et al.*, (2012)

From the present study, it is evident that the genotypes studied may provide good source of material for further breeding programme. Therefore the information on the genetic parameters such as coefficient of variation, heritability, genetic advance can help the breeders to evolve suitable cultivars within a short time.

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How to cite this article:

Manivelan, K., M. Karthikeyan, K. K. Suvain and Palaniyappan, S. 2019. Genetic Variability, Heritability and Genetic Advance for Yield in Mung Bean [*Vigna radiata*(L.)Wilczek]. *Int.J.Curr.Microbiol.App.Sci.* 8(09): 2252-2255. doi: https://doi.org/10.20546/ijcmas.2019.809.259