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Short Communication

Study of Correlation in Mungbean (*Vigna radiata* L.) for Seed Yield and Yield Contributing Traits

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ABSTRACT: The current study, titled 'Study of correlation in Mung bean (*Vigna radiata* L.) for seed yield and yield contributing traits', was conducted during *Kharif* 2021 at the Department of Agricultural Botany, College of Agriculture, VNMKV, Parbhani. The experiment was conducted in a Randomized Block Design (RBD) with two replications. All 34 treatments had four 4.5-meter-long rows with a 45-centimetre space between them and a 10-centimetre plant spacing. Morphological observations like days to 50% flowering, days to maturity, days to shattering, plant height (cm), number of primary branches per plant, number of pods per cluster, number of pods per plant, pod length (cm), number of seeds per pod, 100 seed weight (g), and seed yield per plant (g) were recorded. The seed yield trait in this study showed an important positive association with the number of pods per plant, pods per cluster, number of seeds per pod, and pod length (cm). It also found a strong negative association with plant height.

Keywords: Correlation, Mung bean, Seed yield, *Vigna radiata*

INTRODUCTION

Pulses are commonly referred to as 'poor man's meat'. It is the principal source of dietary protein for a significant portion of the world's vegetarian population [1]. Pulses have an average protein level of 17 to 40%, which is approximately 1.5 to 3.0 times that of cereals [2]. Pulses account for 71 million tons and 79 million hectares of global food production. India comes third, with an area of approximately 4.5 million ha and a total production of 2.5 million tonnes [3]. Mung bean (*Vigna radiata* L. Wilczek) is a major pulse crop in India. Mung bean is a well-known crop in Asian countries, and India is the world's largest pulse producer and consumer, accounting for 22% of worldwide output and 33% of total global production. It is the third most important pulse crop, after Red Gram and Chickpea [4]. Mungbean is a popular grain legume, especially in Asia. It is a warm-season crop that may be cultivated in the dry and semi-arid tropics, as well as during hot, humid weather [5,6]. Mung bean protein is added to foods, something cereals cannot provide. The sprouted seed has nutritional value comparable to asparagus or mushrooms [7]. During sprouting, thiamine, niacin, and ascorbic acid levels rise [8]. Dietary values in mung beans are derived from their substantial and easily digestible protein content. According to Saleem *et al*. [9], seeds contain total protein, total amino acids, crude fibre, and fatty components.

Correlation coefficient analysis is a tool used to analyse the mutual link between plant traits and to identify component characteristics that might serve as the foundation for selection aimed at increasing yield. significant positive correlations between traits will accelerate genetic progress; on the other hand, significant negative correlations will impede genetic improvement after character selection. The experiment was therefore carried out to investigate the connection between seed yield and yield-contributing traits.

MATERIALS AND METHODS

At the experimental field of the Department of Agricultural Botany, College of Agriculture, VNMKV, Parbhani, MS, India, the experiment was carried out in *Kharif* 2021. Two replications of the Randomized Block Design (RBD) were used, and each treatment consisted of four rows that were each 4.5 meters long and separated by 45 cm, plant to plant distance was managed for 10 cm to maintain the optimal plant population. All agronomic practices were

Table 1. Experimental Material (genotypes and checks) used in the study

Sr. No.	Genotypes & checks	Sr. No.	Genotypes & checks
1	Phule M 707-5	18	AKM-12-23
2	AKM-12-14	19	Phule M 818-8
3	Phule M 602-9	20	Phule M 809-10
4	AKM-12-24	21	Phule M 402-2-1
5	BM-2019-1	22	Phule M 504-20-27
6	Phule M 702-1	23	AKM-1606
7	AKM-1609	24	AKM-1605
8	AKM-1603	25	AKM-1608
9	AKM-1602	26	BM-4 (C)
10	Phule M 816-10	27	BPMR-145 (C)
11	Phule M 817-13	28	BM-2002-1 (C)
12	TBM-4	29	BM-2003-2 (C)
13	TBM-6	30	PKVM-4 (C)
14	AKM-12-28	31	PKVM-8802 (C)
15	TBM-10	32	PKV-Green Gold (C)
16	TBM-127	33	Vaibhav (C)
17	Phule M 809-12	34	Utkarsh (C)

'(C)' indicates the checks used in this study.

carried out under the recommendations for improving crop quality.

Various pulse research stations in Maharashtra were the source of the 34 genotypes that made up the experimental material, together with checks. The genotypes and checks used in the present study are well-presented in Table 1 and in earlier work [1].

Plant height (cm), number of primary branches per plant, number of pods per cluster, number of pods per plant, length of pod (cm), number of seeds per pod, 100 seed weight (g), and seed yield per plant (g) were recorded on randomly selected five representative plants as suggested by Thakur *et al.* [10]. Morphological traits such as days to 50% flowering, days to maturity, and days to shattering were recorded on the plot basis. A statistical analysis was performed on the characters that were recorded in the field.

Statistical analysis

The data were statistically analysed using the standard procedure recommended by Panse and Sukhatme [11]. The analysis of variance for each character was performed and is shown in Table 2. Significant differences between the genotypes were found in the characteristics examined in this investigation.

RESULTS AND DISCUSSION

The magnitude and direction of an association between two or more variables is referred to as correlation [12]. By analysing the relative influence of several characters on yield as well as among themselves, the correlation makes it possible to discover the character or combination of characters that may be useful as an indicator of high yield [12]. After calculating an analysis of variances (ANOVA) to the mean values of the recorded observations for the randomized block design (Table 3), it was discovered that the genotype-related mean squares were significant for every character in the current study. Similar results were also reported by Kadam *et al* [1]. For every character in the analysis, the genotype-related variations were significant at the 5% and 1% probability levels. Significant variances in characters suggest the presence of variability in the experimental genotypic material.

Seed yield is a complex, dependent variable that is influenced by several independent traits. According to Table 4, Figure 1, the number of pods per plant (0.496), number of pods per cluster (0.335), number of seeds per pod (0.312), and pod length (0.211) all positively and significantly correlated with seed yield in the current study. Plant height (0.157), 100 seed weight (0.146), and the number of primary branches per plant (0.032) all positively correlated with seed yield per plant. Thus, it shows that an increase in these traits that contribute to yield also indicates an upsurge in yield. But it has a negative correlation with the days to 50% flowering (-0.217), the days to maturity (-0.06), and the days to shattering (-

Table 2. Analysis of variance for experimental design

Source of variation	d. f.	Sum squares	Mean sum of squares	Expected M.S.
Replications	(r–1)	SS_1	M_1	$\sigma^2 e + g\sigma^2 r$
Genotypes	(g–1)	SS_2	M_2	$\sigma^2 e + r\sigma^2 g$
Error	(r–1) (g–1)	SS_3	M_3	$\sigma^2 e$
Total	(rg–l)	-	-	-

where, r = Number of replications; g = Number of genotypes; σ^2 e = Error variance; σ^2 r = Variance due to replications; σ^2 g = Variance due to genotypes

Table 3. Analysis of variance (ANOVA) for randomized block design for traits studied in Mungbean

Sr. No.	Characters	Source of variation		
		Replication d. f. (1)	Genotypes d. f. (33)	Error d. f. (33)
1	Days to 50% flowering	0.72	6.64**	1.02
2	Days to maturity	0.53	10.27**	6.35
3	Days to shattering	3.37	44.14**	0.94
4	Plant height (cm)	115.25	239.65**	15.57
5	No. of primary branches	0.92	2.37**	0.03
6	No. of pods/cluster	0.13	0.71**	0.04
7	No. of pods/plant	9.94	60.31**	2.44
8	Length of pods (cm)	0.13	7.37**	0.05
9	No. of seeds/ pod	0.16	4.96**	0.27
10	100 seed wt. (g)	0.01	0.74**	0
11	Seed yield/plant (g)	1.17	11.39**	0.87

* Significant at 5 per cent and ** 1 per cent level

0.222). This suggests that the yield decreases with increasing days to shattering, days to 50% flowering and days to maturity. This finding is also supported by Khatik *et al*. [13].

A large seed yield per plant can be achieved by having more primary branches, which can grow into more pods. In this study, results indicate that the number of primary branches per plant is high and significantly correlated to the number of pods per plant (0.503). Similar findings were earlier reported by [1, 10, 14, 15, 16].

The present study suggests that selection for high seed yield genotypes should be based on the number of pods per plant, pods per cluster, seeds per pod and length of pod. While selecting the high-yielding genotypes breeder

Table 4. Correlation coefficient for yield and yield contributing traits

	50% FLO	DM	PH	SHAT	PRI	P/ C	P/ P	PL	S/ P	100SW
50% FLO	1	-0.1688	-0.0238	-0.0602	-0.037	-0.3126**	-0.15	-0.0815	0.1082	0.0643
DM	-0.1688	1	0.1936	0.2546*	0.0355	0.1233	0.1542	-0.1465	-0.3207**	-0.177
PH	-0.0238	0.1936	1	-0.0065	-0.1303	-0.0554	-0.3823**	0.0152	-0.2916*	0.0031
SHAT	-0.0602	0.2546*	-0.0065	1	-0.0491	0.2153	-0.1009	-0.1546	0.1336	-0.2419*
PRI	-0.037	0.0355	-0.1303	-0.0491	1	-0.0553	0.5031***	-0.0036	0.174	0.2259
P/C	-0.3126**	0.1233	-0.0554	0.2153	-0.0553	1	0.4877***	-0.3135**	-0.0956	-0.4756***
P/P	-0.15	0.1542	-0.3823**	-0.1009	0.5031***	0.4877***	1	-0.1702	0.0323	-0.2995*
PL	-0.0815	-0.1465	0.0152	-0.1546	-0.0036	-0.3135**	-0.1702	1	0.0128	0.7035***
S/P	0.1082	-0.3207**	-0.2916*	0.1336	0.174	-0.0956	0.0323	0.0128	1	0.1153
100SW	0.0643	-0.177	0.0031	-0.2419*	0.2259	-0.4756***	-0.2995*	0.7035***	0.1153	1
SYPP	-0.2177	-0.0643	0.1571	-0.2223	0.0327	0.335**	0.496*	0.2119**	0.312**	0.1465

50% FLO=Days to 50% flowering, DM=Days to maturity, PH=Plant height, SHAT=Days to shattering, PRI=No. of primary branches, P/ C=No. of pods/cluster, P/ P=No. of pods/plant, PL=Length of pods, S/ P=No. of seeds/ pod, 100SW=100 seed weight

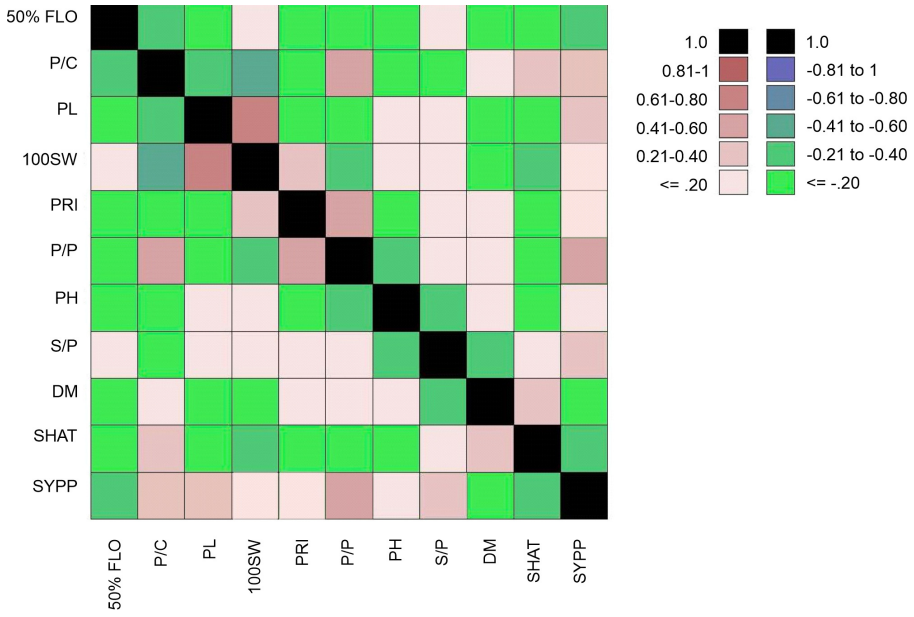

Figure 1. Correlation matrix for the correlation analysis studied in the mungbean

should avoid choosing traits like days to 50% flowering, days to maturity and days to shattering.

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