

## GENETIC VARIABILITY AND HERITABILITY OF YIELD AND RELATED CHARACTERS IN YARD-LONG BEAN

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**Abstract:** Fifty varieties of yard-long bean were evaluated for yield and a few related characters in a field experiment in randomized block design with three replications during rabi season, 1999. Analysis of variance revealed significant differences among varieties for all the characters studied. High **genotypic** coefficient of variation, **heritability** in broad sense and genetic advance estimated for the characters viz., yield of vegetable pods per plant, number of pods per plant and pod weight indicated the scope for improvement of these characters through selection.

**Key words:** Yard-long bean, variability, heritability, genetic advance

### INTRODUCTION

Yard-long bean (*Vigna unguiculata* ssp. *sesquipedalis* [L.] Verde.) is a distinct form of cowpea grown as a vegetable crop in southern Asia and the Far East for its immature pods, which are used as a vegetable. The crop grown in different parts of India has its most extensive cultivation in Kerala. Cultivation of the crop from ancient times in Kerala has resulted in a rich and diverse domestic germplasm. Despite its importance as a common vegetable crop, the research effort to improve the crop capitalizing on the variability in traditional cultivars has been meagre.

The information on variability and heritability of characters is essential for identifying characters amenable to genetic improvement through selection. Hence a study with the broad objective of evaluating the variability in a yard-long bean varietal collection comprising primarily of local cultivars was undertaken.

### MATERIALS AND METHODS

The material for the study comprised of 50 cultivars of yard-long bean, of which 48 were local cultivars collected from different localities in Kerala and the other two were varieties developed through pureline selection from indigenous germplasm. The cultivars were raised in a field experiment in randomized block design with three replications in the Instructional Farm, College of Agriculture, Vellayani, Trivandrum during rabi season, 1999. Plot size was 3.0 m x 2.1 m. Spacing was 1.0 m between rows and 0.3 m between plants in a row. Plants were trailed on coir ropes tied between wooden stakes erected 1.0 m apart along rows of plants. The crop was raised following the agronomic

practices recommended by the Kerala Agricultural University (KAU, 1996).

Data on number of days to first flowering, length of harvesting period (number of days from first to last harvest), number of pods per plant and yield of vegetable pods per plant were collected from five randomly selected plants from each plot. Pod characters viz., pod length, pod girth, pod weight and number of seeds per pod were recorded from 10 randomly selected pods at vegetable maturity stage from each plot. The data were subjected to analysis of variance. The genetic parameters viz., **phenotypic** coefficient of variation (PCV) and **genotypic** coefficient of variation (GCV) were estimated. The heritability in broad sense and genetic advance as percentage of mean were estimated employing the methods suggested by Jain (1982) and Miller *et al.* (1958) respectively.

### RESULTS AND DISCUSSION

The analysis of variance (Table 1) revealed significant differences among the varieties for all the characters studied. The existence of high variability for different characters among vegetable cowpea varieties had been earlier reported by Ramachandran *et al.* (1980), Hazra *et al.* (1996) and Resmi (1998).

The genetic parameters viz., **genotypic** and **phenotypic** coefficients of variation, **heritability** in broad sense and genetic advance along with mean and range of different characters are presented in Table 2. The wide range especially for number of pods per plant, pod yield per plant and pod characters indicated the diversity among the yard-long bean cultivars.

Yield of vegetable pods per plant recorded the highest **phenotypic** and **genotypic** coefficients of

Table 1. Analysis of variance of eight characters in 50 yard-long bean genotypes

Sl. No.	Characters	Mean squares		
		Replication	Genotype	Error
1	Days to first flowering	4.08	19.59**	2.33
2	Length of harvesting period	15.34**	30.49**	12.96
3	Number of pods per plant	40.37**	104.72**	4.35
4	Yield of vegetable pods per plant	15672.00**	29485.35**	1004.49
5	Pod length	40.92**	92.66**	2.96
6	Pod girth	0.84	38.69**	1.77
7	Pod weight	1.55*	25.10**	0.45
8	Number of seeds per pod	2.06**	3.69**	0.37

\*Significant at 5 per cent level; \*\* Significant at 1 per cent level

Table 2. Genetic variability parameters of yard-long bean genotypes (n=50)

Characters	Mean $\pm$ SE	Range	Coefficients of variation		Heritability %	Genetic advance
			Geno- typic	Pheno- typic		
Days to first flowering	47.33 $\pm$ 0.88	40.07-52.33	5.07	6.01	71.16	8.81
Length of harvesting period, days	34.68 $\pm$ 0.89	27.07-41.27	8.83	9.88	79.95	16.26
Number of pods per plant	23.29 $\pm$ 1.20	14.13-45.53	24.83	26.39	88.48	48.13
Yield of vegetable pods per plant, g	353.95 $\pm$ 18.29	208.37-614.27	27.53	28.95	90.43	53.93
Pod length, cm	42.53 $\pm$ 0.95	32.33-57.07	12.88	13.44	91.76	25.42
Pod girth, mm	26.19 $\pm$ 0.77	18.73-33.40	13.39	14.33	87.40	25.81
Pod weight, g	15.82 $\pm$ 0.39	11.90-28.60	18.12	18.61	94.77	36.35
Number of seeds per pod	18.62 $\pm$ 0.35	16.73-21.40	5.65	6.53	74.69	10.04

variation followed by number of pods per plant and pod weight. This suggested the scope for improvement of these characters through selection. High GCV and PCV for vegetable pod yield and number of pods per plant were earlier reported by several workers (Rajaravindran and Das, 1997; Resmi, 1998 and Vardhan and Savithamma, 1998).

Heritability estimates were high for all the characters studied. The values were especially high for pod weight, pod length, yield of vegetable pods per plant and number of pods per plant. High heritability for vegetable pod yield and pod weight reported by Sobha (1994) and Resmi (1998) supports the present findings. Further, similar to the present results, high heritability for number of pods per plant and pod length was reported by Vardhan and Savithamma (1998) and Sreekumar *et al.* (1996), respectively.

Johnson *et al.* (1955) suggested that high heritability combined with high genetic advance is indicative of additive gene action and selection based on these parameters would be more reliable. In the present investigation, high heritability estimates in conjunction with high genetic advance were observed for number of pods per plant, yield of vegetable pods per plant, pod weight and pod length. Sobha (1994) reported high heritability and high genetic advance for pod weight and pod yield per plant. In view of the high estimates of genotypic coefficient of variation, heritability and genetic advance recorded for vegetable pod yield per plant, number of pods per plant and pod weight in the present study, it is concluded that worthwhile improvement in these characters can be achieved through selection.

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