

## Assessment of Genetic Variability Parameters in Cowpea (*Vigna unguiculata* (L). Walp) in F<sub>2</sub> Generation

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### ABSTRACT

The present investigation has been carried out with 150 plants in the F<sub>2</sub> generation derived from the cross IT-38956 × KBC-2 to study genetic variability parameters for yield and yield attributing traits. PCV values were relatively higher than GCV values in F<sub>2</sub> generation, with moderate to high heritability in broad sense coupled with moderate to high genetic advance as present of mean for the traits viz., secondary branches per plant, pods per plant and seeds per pod thus, indicating that these characters exhibited moderate to wide range of genetic variability. Heritability these characters were due to additive gene action and selection will be effective. This will help the breeders for selection of plants on the basis of phenotypic expression.

**Keywords** Cowpea, Genetic variability, Phenotypic coefficient of variation, Heritability, Genetic advance as percent of mean.

### INTRODUCTION

Cowpea is an annual herb with strong tap root system

with different growth habit i.e. erect, semi erect, trailing or climbing, bushy annual with glabrous stem. The trifoliate leaves arise alternatively and terminal leaflet is frequently longer and greater leaf area than that of a symmetrical lateral leaves. Flowers are racemose or indeterminate inflorescence at the distal ends of peduncles which are in leaf axil. The flower is typical with five sepals in gamo sepalous condition containing five petals in polypetalous condition. The flowers are born on short peduncle and corolla varies in color from white to purple.

In Karnataka, cowpea is grown in almost all the districts, with an area of 0.78 lakh hectares with a production of 0.22 lakh tones. The productivity is only 302 kg/ha during the year 2012-13 (Source: Directorate of Economics and Statistics, Govt of Karnataka).

Cowpea is a hardy crop is known for its drought tolerance. Its wide and droopy leaves keep soils and soil moisture conserved due to shading effect. Initial fast growth with fast penetrating root system and strong stomatal sensitivity justify its initial establishment in soil moisture deficit conditions. Cowpea was grown in residual moisture condition can yield in the range of 25–30 quintals of seed per hectare.

The effective crop improvement program is very essential to assess the genetic variability for the desired trait or trait of interest. It is also important to understand the association of seed yield and with other related traits.

The information on association on between yield and its various components provides basic for select-

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**Table 1.** Estimates of genetic variability parameters for seed yield and its components in cowpea for the cross (IT-38956 × KBC-2) in F<sub>2</sub> population. DFF- Days to first flowering ; DM- Days to maturity; PHT-Plant Height ; PP- Plant height; PBP-Primary branches per plant; SBP- Secondary branches per plant ; PP- Number of Pods Per Plant; PL-Pod length; SPP-Seed Per Plant ; SYP-Seed yield per plant ; HSW-Hundred seed weight.

Sl. No.	Traits	Mean	Range Min	Max	GCV (%)	PCV (%)	<i>h</i> <sup>2</sup>	GAM (%)
1	DFF	45.72	40.0	52.0	2.86	10.25	79.7	11.66
2	DM	82.32	78.0	86.0	1.81	7.12	64.3	22.65
3	PHT	22.85	15.20	30.60	3.75	23.13	36.3	1.25
4	PBP	5.5	4.0	17.0	14.14	25.54	16.13	3.06
5	SBP	1.97	8.0	15.0	5.52	13.71	16.23	4.58
6	PP	14.25	12.0	16.0	7.09	13.64	11.27	7.6
7	PL	15.28	12.10	18.90	9.00	18.44	23.00	16.69
8	SPP	15.92	8.0	18.0	12.85	19.78	42.2	13.31
9	SYP	19.80	12.15	26.35	7.91	22.81	12.05	18.74
10	HSW	11.75	10.12	13.35	1.72	7.24	6.25	11.11

ing improved varieties. The present study conducted to get the information on genetic variability and interrelationship for grain yield and its related traits in cowpea for future breeding program.

## MATERIALS AND METHODS

The present experiment has been carried out with the 150 plants in the F<sub>2</sub> population derived from the cross IT-38956 × KBC-2 in Dry Land Agriculture Project, Gandhi Krishi Vignana Kendra, GKVK campus of the University of Agricultural Sciences, Bangalore the each plants have been space plated with a spacing of 30 cm between the plants. Recommended package of practice has been followed. The following observations has been recorded days to first flowering, days to maturity, plant height, primary braches per plant, secondary braches per plant, pods per plant, pods per plant, seeds per pod, seed yield per plant and hundred seed weight. Statistical analysis were calculated as described by Falconer.

## RESULTS AND DISCUSSION

### Genotypic and phenotypic coefficients of variation

The range, mean, genotypic, genotypic coefficient of variation (GCV), phenotypic coefficient of

variation (PCV), heritability (in broad sense) and genetic advance as present of mean of 150 cow pea plants in the F<sub>2</sub> generation are presented in Table 1. A low, moderate and high wide range of variability was observed among the plants against all the characters studied. Estimate for genotypic coefficient of variation (GCV) was ranged from 1.82 to 14.14 % and highest for primary branches per plant (14.14%) followed by seeds per pod (12.85%) and other characters are exhibited the low variation. The maximum phenotypic coefficient of variation was recorded for primary braches per pant (25.54%) followed by plant height (25.54), seeds yield per plant (22.81%), seeds per plant (19.78 %), pod length (18.44%). Low, Moderate and high values of GCV and PCV with narrow difference in both the cross indicating low influence of environment on expression of this trait. These, results are in agreement with earlier reports of Kumar *et al.* (2009), Kumar *et al.* (2013), Tigga *et al.* (2014), Bhawna and Singh (2015), Lokesh and Niranjnamurthy (2018).

### Heritability and genetic advance

Estimates of heritability ranged from 6.25 (hundred seed weight) to 79.7% (days to first flowering), maximum heritability was observed for days to first flowering (79.7 %) followed by number of pods per plant (96.58 %), days to maturity (64.3 %), seeds per pod (42.2%) and other characters were exhibited the low heritability. The estimates of genetic advance

ranged from 1.25 to 22.65 with the highest estimate for the trait days to maturity (22.65%), seeds yield per plant (18.74%), pod length (16.69%), days to first flowering (11.66 %) and other traits exhibited the low values. High broad sense heritability coupled with low genetic advance as per cent of mean indicated the predominant role of non-additive gene action and high scope for further improvement of this trait through simple selection in  $F_2$  population. These findings were similar with that of Singh *et al.* (2010), Tigga *et al.* (2014). It indicated the predominance of additive gene action for controlling these traits. Therefore, selection based on phenotypic performance would be effective for the improvement of these traits.

## CONCLUSION

The assessment of genetic parameters like phenotypic and genotypic coefficient of variation, heritability and genetic advance as percent of mean indicated selection must be done in the characters like pods per plant and seeds per pod to improve the yield to

generate genetic variability followed by selection in further generations to identify superior segregants.

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