

Genetic Variability Analysis in Field Pea (*Pisum sativum* L.)

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Abstract: The present experiment was conducted during November 2012 - March 2013 in the department of Genetics and Plant-Breeding to estimate variability analysis of some reproductive characters on grain yield of 12 fieldpea genotypes. The experiment was laid out in a Randomized Block Design (RBD) at the research farm, SHIATS Allahabad. The genotypes showed moderate to high level of genotypic coefficient of variability (GCV), phenotypic coefficient of variability (PCV), heritability and genetic advance were observed for days to 50% flowering, plant height, number of pods per plant, days to maturity, number of seed per pod, pod length, 100-seed weight and grain yield per plant. The magnitudes of the phenotypic variance of these traits were higher than the genotypic variance, indicating that the phenotypic component was the major contributor to total variance. Among all traits, plant height exhibited high estimates of GCV and PCV (48.10 and 48.42) followed by seed yield per plant (24.36 and 33.69) and number of seed per pod (16.40 and 20.36). High broad-sense heritability (52.00% - 99.00%) indicated the presence of additive gene effects.

Keywords: genotypes, fieldpea, variance, heritability, genetic advance.

1. Introduction

Field pea (*Pisum sativum* L.) is the most important legume crop of India. It is the second most important food legume worldwide after *Phaseolus vulgaris*. Peas are a rich source of protein having essential amino acids particularly lysine. This considered the cheapest source of protein in diet. Pea is an important plant in human and animal nutrition because of its high protein level (23- 33%) (Cousin et al., 1985). Presence of high variability in this crop offers much scope for its improvement. Hence, an attempt was made to estimate genetic variability, heritability and genetic advance in the available germplasm of field pea (*Pisum sativum* L.). A quantitative measure which provides information about the correspondence between genotypic variance is heritability.

2. Material and Methods

The experimental material for the present investigation consisted of 12 genotypes (Table 1.) which were obtained from the Department of Genetics and Plant Breeding, SHIATS, Allahabad, India. The present experiment was conducted in randomized block design at Field Experimentation Centre, Department of Genetics and Plant Breeding, Allahabad during *rabi*, 2012. Recommended cultural practices were followed to raise a good crop. Five competitive plant from each genotype were randomly selected for recording observations for eight characters viz. days to 50 per cent flowering, plant height (cm), number of pods per plant, days to maturity, number of seeds per pod, pod length (cm), seed index (g) and seed yield per plant (g). The GCV and PCV (Burton, 1952), heritability (Burton and Devane, 1953), genetic advance (Lush, 1949) were estimated.

3. Results and Discussion

The analysis of variance revealed highly significant differences for all characters under study among the 12

genotypes at 1 % level of significance, indicating the presence of sufficient variability among genotypes. In general, phenotypic coefficient of variation (PCV) values was higher than genotypic coefficient of variation (GCV) values, which indicated the effect of environment on the expression of characters (Table 2.). High PCV and GCV were recorded for plant height, seed yield per plant and number of pods per plant. Kumar et al. (2001) and Sirohi et al. (2006) reported high phenotypic (PCV) and genetic (GCV) coefficients of variation for plant height, number of pods per plant and seed yield per plant indicating greater scope of selection for these traits.

All the characters showed maximum heritability in 12 field pea genotypes. Maximum heritability (broad sense) was recorded for each characters i.e., plant height (99%) followed by days to 50% flowering (95%), days to maturity (70%), number of seed per pod (65%), Pod length (64%), seed index (63%), seed yield per plant (52%), number of pods per plant (45%) and Maximum genetic advance as percent of mean was recorded for plant height (115.66%) followed by days to 50% flowering (12.11%), seed yield per plant (7.70%), No. of pods per plant (6.80%), days to maturity (5.22%) and seed index (2.02%), whereas minimum genetic advance was recorded for pod length (0.66%) followed by number of seeds per pod (1.42%). Sultana et al. (2003) reported high estimates of heritability and genetic advance as percent of mean for plant height, days to 50% flowering and seed yield per plant.

Table 1: Experimental material included in present experiment

S. No.	Name of Genotypes
1.	FP 12-18
2.	RF 12-9
3.	RF 12-15
4.	RF 12-10
5.	FP 12-63
6.	RF 12-75
7.	RF 12-72
8.	RF 12-65

9.	RF12-96
10.	RF12-94
11.	RF12-38
12.	RF12-45

Table 2: Coefficient of variation, Heritability and Genetic Advance for 08 yield contributing characters of 12 fieldpea genotypes

S. No.	Characters	Coefficients of Variation		Heritability (bs) (%)	Genetic Advance	Genetic Advance as per cent of mean
		GCV	PCV			
1	Days to 50% flowering	7.33	7.54	95.00	12.11	14.69
2	Plant height	48.10	48.42	99.00	115.66	98.42
3	No. of pods/plant	15.45	23.14	45.00	6.80	27.23
4	Days to maturity	2.34	2.79	70.00	5.22	4.03
5	Pod length	6.27	7.81	64.00	0.66	10.37
6	No. of seeds/ pod	16.40	20.36	65.00	1.42	27.22
7	Seed index	7.09	8.94	63.00	2.02	11.56
8	Seed yield/ plant	24.36	33.69	52.00	7.70	36.29

4. Conclusion

The results from the present investigation can be concluded that RF12-9 genotype was identified as a desirable genotype with early flowering, plant height and more number of pods per plant. Plant height and seed yield per plant recorded high estimates of GCV, PCV and heritability, while plant height and seed yield per plant recorded high estimates of genetic advance as percent of mean.

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