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PHENOTYPIC STABILITY FOR SEED YIELD IN PIGEONPEA

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ABSTRACT

Ten genotypes of short duration pigeonpea were grown in four environments and seed yield data analysed for stability parameters. Highly significant mean squares were observed for genotypes, genotype x environment interaction and environment (linear). ICPL 151 was the most stable genotype under rainfed conditions of Doon Valley as it had high mean, regression coefficient not deviated from unity, and non significant minimum deviation from regression.

Key words: Phenotypic stability, pigeonpea, *Cajanus cajan*.

Short duration and high yielding varieties of pigeonpea (*Cajanus cajan* L. Millsp.) have been identified, which have enabled double cropping in the region. Both from breeding as well as cultivation point of view, the information on stability in the crop is very important. Literature on phenotypic stability in the pigeonpea crop is scanty for the region [1, 2].

Ten promising short duration genotypes of pigeonpea were tested in randomized complete block design with three replications for four years from 1987 to 1990 at Dehradun. A plot consisted of 5 rows, 4 m long, spaced 30 cm apart. Plant-to-plant distance was kept at 10 cm. The seed yield data per plot were recorded in all the four years. Statistical analysis was carried out separately for each year and for pooled data. The data were further analysed for stability parameters [3].

Environment (year)-wise analysis revealed that significant differences existed among genotypes under each environment. Pooled analysis indicated that genotypes and genotype x environment interaction were highly significant. Highly significant environment (linear) suggested considerable difference among environments and their predominant effect on yield. The significant genotype x environment (linear) interaction revealed that the amount of variability existed not only among genotypes but also the environments. The significant genotype x environment also indicated that the regression coefficients (bi) were not of the same order.

All the stability parameters, i.e. mean (Xi), regression coefficients (bi), and deviation from regression (S^2di), were estimated (Table 1). The general mean yield of pigeonpea was 1892 kg/ha with a wide fluctuation from 1146 (Local Tur) to 2568 kg/ha (ICPL 151). All the ICPL genotypes gave higher mean yield than the general mean yield. The yield trend was similar in different years.

Table 1. Stability parameters for seed yield in pigeonpea

Genotype	Seed yield (kg/ha)					bi	S^2di
	1987	1988	1989	1990	Xi		
ICPL 4	1791	1958	1804	2152	1926	+ 1.02	+ 39004**
ICPL 87	1763	1951	1862	2187	1941	+ 0.56	+ 48005**
ICPL 151	2541	2660	2500	2569	2568	+ 1.45	-59^{NS}
ICPL 8322	2298	2500	2354	2430	2396	+ 1.48	+ 4388**
ICPL 84027	2145	2347	2145	2250	2222	+ 1.90+	+ 2340**
UPAS 120	1638	1451	1654	1319	1516	-1.49+	+ 31114**
T. 21	1791	1606	1633	1389	1604	-0.19+	+ 40633**
H 77-216	1659	1944	1666	1806	1769	+ 2.63+	+ 4892**
Manak	1882	1910	1800	1736	1832	+ 1.08	+ 5431**
Local Tur	1285	1250	1075	972	1146	+ 1.56	+ 24658**
General Mean	1879	1958	1849	1881	1892		
SE (Xi)	22	17	17	15	67		
SE (bi)						0.37	

*,**P = 0.05 and 0.01, respectively.

+Denotes deviation from regression coefficients from unity.

The regression coefficients (bi) varied from -1.49 to + 2.63. The regression coefficient was significant only for one genotype, i.e. ICPL 151, and for the remaining genotypes regression coefficients were not significant. Four regression coefficients, viz., + 2.63 (H 77-216), + 1.90 (ICPL 84027), -0.1951 (T 21) and -1.49 (UPAS 120) significantly deviated from the unit value of regression coefficient while the remaining regression coefficients did not deviate from unity. Out of the ten pigeonpea genotypes under study, nine had significant S^2di for the seed yield. The genotype ICPL 151 gave nonsignificant minimum value of S^2di.

On the basis of individual parameters of stability (Xi, bi and S^2di), it is evident that the genotype ICPL 151 exhibited highest seed yield (2568 kg/ha), did not deviate its regression

coefficient (bi = 1.45) from unity, and had nonsignificant minimum deviation (S^2di = -59). Therefore, this genotype is specifically suitable for the rainfed conditions of Doon Valley.

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