

## Study of genetic parameters in pearl millets

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### ABSTRACT

Present investigation "study of genetic parameters in pearl millet (*Pennisetum glaucum* (L.) R.Br.) was conducted with the objective to collect the information on variability, heritability, genetic advance among 45 F<sub>1</sub>s and 10 parents in pearl millet. The analysis of variance revealed that mean square were highly significant for all the character except effective tillers/plant. The maximum range was found for plant height and minimum for effective tillers/plant. The highest genotypic coefficient of variation was observed for grain yield followed by 1000 seed weight, panicle length, panicle girth, plant height and moderate for effective tillers/plant, days to 50% flowering and Minimum for days to maturity. The highest phenotypic coefficient of variation was observed for effective tillers/plant followed by grain yield, 1000 seed weight, panicle length, panicle girth and plant height. The high estimates of heritability were observed for all the characters taken under study except number of effective tillers/plant. The genetic gain was observed for grain yield followed by 1000 seed weight, panicle girth, panicle length and least for effective tillers. Grain yield/plant and 1000 seed weight recorded high amount of genetic advance. High heritability with high genetic advance may be attributed to the action of additive genes, these characters also exhibited high GCV. Therefore phenotypic selection of these characters would be effective for the yield improvement.

**Key words:** Genetic parameters, Pearl millet.

Pearl millet is undoubtedly an important crop and it has vast potential out of all the millets. It is cultivated for grain as well as for fodder in the arid regions. Genetic improvement of expression in quantitative character is dependent upon genotypes with a range of genetically controlled variability for the character under consideration. The estimation of genetic variability is a prerequisite as the variability in any population is a factor of genetic and environmental components. An attempt was made to evaluate the variability present in the available genetic material and determinations were made for coefficient of variation, heritability of traits and genetic advance for yield and yield attributing characters to formulate effective breeding programme.

The experiment was laid out using 45 F<sub>1</sub> hybrids and their 10 parents were grown in a randomized Block design with three replications at agriculture college farm Gwalior during Kharif 2002. Observations were recorded on five randomly chosen competitive plants for eight quantitative characters viz. Days to 50% flowering, plant height,

effective number of tillers/plant, days to maturity, length of panicle, girth of panicle, 1000 grain weight and grain yield/plant. The statistical analysis was performed on the mean data. Variability parameters were estimated as per the standard formula elaborated by the Johnson *et al.* (1955). Genotypic and phenotypic coefficients of variation were determined following the standard procedure (Burton 1951). Heritability ( $h^2$ ) and genetic advance were estimated following respective methods elaborated by Allard (1960) and Robinson; Comstock and Harvey (1949).

The mean, range, genotypic and phenotypic coefficient of variation, heritability and genetic advance as percent of mean for eight characters of pearl millets are presented in table-1. In this investigation analysis of variance revealed that the mean squares due to entries were highly significant for all eight characters except effective tillers/plant indicating high amount of variability, which provided better scope for selection in further breeding programme. The highest range of observation was observed for plant height (159.00-

**Table 1: Mean, range, coefficient of variation, heritability and genetic advance for eight characters**

S. No.	Name of characters	Mean	Range		Coefficient of variation		Heritability (%)	Genetic advance	Genetic advance as % of mean
			Max	Min	Geno (%)	Pheno (%)			
1	Days to 50% flowering	42.35	47.00	38.67	05.17	05.48	89.23	04.26	10.07
2	Plant height (cm.)	187.85	190.67	159.00	11.67	14.02	69.16	37.33	19.98
3	Days to maturity	71.58	80.00	65.67	04.72	04.77	97.98	06.89	09.62
4	Effective tillers/plant	01.86	23.33	01.33	07.37	30.71	05.76	00.07	03.64
5	Panicle length (cm)	19.91	25.78	13.88	14.83	19.46	58.09	04.64	23.29
6	Penicle girth (cm)	02.24	2.90	01.62	13.83	16.71	68.44	00.57	25.58
7	Grain weight (gm)	06.83	11.33	04.47	19.74	20.28	94.75	02.71	39.59
8	1000 seed weight (gm)	22.73	29.57	12.92	23.53	26.90	76.55	09.64	42.42

190.66) followed by days to maturity (66.66-80.00), grain yield (12.91-29.56), panicle length (13.88-25.77) and 1000 seed weight (4.46-11.33). Karale *et al.* (1998) also reported significant variability for grain yield and Tomar *et al.* (1995) also observed high variability of plant height, ear length. The maximum genotypic coefficient of variation was observed for 1000 seed weight, grain yield/plant and panicle length while phenotypic coefficient of variation was reported for effective tillers/plant followed by number of 1000 seed weight, grain yield/plant and panicle length. The consistent behavior of both at phenotypic and genotypic levels observed for days to 50% flowering, days to maturity that these characters were least influenced by non genetic factors. While number of effective tillers/plant is more influenced non genetic factors. Vyas and Shrikant

(1984) also observed maximum phenotypic and genotypic coefficient of variations in grain yield followed by panicle length and effective tillers/plant. High heritability was observed for all characters under study. Chaubey and Richharia (1993) were also observed high heritability or panicle length, plant height and grain density per square meter. Greater genetic advance may be expected from population with high mean and wide range of phenotypic variability. The estimate of expected genetic gain among populations was high for 1000 seeds weight (42.42) followed by grain yield/plant (39.59) and panicle girth (23.20) while low advance for effective tillers/plant (3.64). Kushwah and Singh (1992) has been reported variable degree of expected genetic advance ranging from high to low different traits in pearl millet.

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