https://doi.org/10.29321/MAJ.10.A03002

*Madras agric. J.* 66 (10) : 635—638, Oct., 1979.

# Investigation on Genetic Variability in a 9 x 9 Diallel Set o Pearl Millet (*Pennisetum typhoides* (Burm.) S & H)

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The results of tha investigation indicated that highest value of phenotypic Coefficient of variability was noted fcr yield/plant followed by number of ear-bearing tillers/plant and number of tillers/plant while for characters like ear length, 100-grain weight, plant height and number of internodes/main shoot it was median and lowest being noted for ear girth.

Keeping in view the importance of bajra as a food and fodder, the earlier crop breeders have made significant contribution to develop high yielding forage hybrids and varieties. The present investigation is an added attempt with the objective of generating genetic variability in the available germplasm by making a diallel cross in nine inbreds of pearl millet.

## MATERIAL AND METHODS

The material comprised of nine inbreds viz., IP 2000, IP 2263, IP 2040, IP 2051, IP 2036, Ici 7511, Ici 7504, Ici 7502 and Ici 7503. A diallel cross among these lines was made in 1976 producing 36 $F_1$'s. The 9 parents and their 36 $F_1$'s were grown at R. B. S. College, Research Farm, Bichpuri, Agra in 1977 following randomised block design with three replications. Each strain was represented by a single row of four meter length. Spacing was 50 cm. and 15 cm. between and within lines. Observations were recorded on ten randomly selected plants per row for yield and seven economical traits (Table I).

The data were subjected to analysis of variance and consequently to the estimation of phenotypic and genotypic variances following Burton (1951), while phenotypic as well as genotypic coefficient of variability, heritability, genetic advance and genetic advance as percentage of men according to the methods suggested by Al-Jibouri *et al.* (1958) and Allard (1960).

## RESULTS AND DISCUSSION

The examination of Table I reveals that differences among the parents and hybrids are highly significant for all the characters.

Table II clearly exhibits that coefficient of variability ranges from 4.93% for ear girth to 16.82% for number of ear-bearing tillers/plant. The reasonably higher magnitudes of phenotypic variances for plant height, ear length and yield/plant are possibly due to higher amount

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TABLE. I. Showing analysis of variance

| Source of variation | D.F. | Plant height | No. of tillers per plant | No. of ear-bearing tillers/Plant | Number of internodes/ Main shoot | Ear length | Ear girth | 100-grain weight | Yield/ Plant |
|---|---|---|---|---|---|---|---|---|---|
| Rep. | 2 | 15.450 | 1.322 | 0.093 | 0.032 | 12.755 | 0.075 | 0.004 | 15.110 |
| Trea. | 44 | 1859.552** | 4.059** | 1.382** | 1.423** | 87.603** | 0.988** | 0.065** | 435.865** |
| Error | 88 | 151.267 | 0.334 | 0.194 | 0.263 | 3.918 | 0.118 | 0.006 | 6.201 |

** Significant at 1% level

of genotypic variances for these traits. During selection programme the traits showing high values of both phenotypic and genotypic variances may be preferred. The highest value of phenotypic coefficient of variability was noted for yield/plant followed by number of ear-bearing tillers/plant while for characters like ear length, 100-grain weight, plant height and number of internodes/main shoot it was median and lowest being noted for ear-girth. Similar trend was observed for the genotypic coefficient of variability. The highest value of genotypic coefficient of variability was for yield/plant and lowest being for ear-girth.

Heritability was found to be highest for yield/plant and lowest for number of inter nodes/mainshoot. A similar trend of the heritabllity estimate was observed by Lal and Singh (1970) for the vegetative and economic character in pearl millet.

The genetic advance as percentage of mean was found to vary from 12.75 to 83.61. Its value was maximum for yield/plant followed by number of ear-bearing tillers/plant and number of tillers/plant, Characters like earlength, 100-grain weight and plant height showed median values while its minimum value being observed for number of internodes/main shoot. These results are in agreement with the previous findings of Lal and Singh (1970). He, however, observed contrary results for 100-grain weight and plant height. From the study it is clear that traits with high heritability did not neccessarily possess high values of genetic advance as percentage of mean. Johnson *et al.* (1955) and Panse (1957) are of the opinion that if the heritability is mainly due to dominance and epistasis, the genetic gain would be low but in cases where it is chiefly due to additive gene effects, a high genetic advance may be expected.

It is, therefore, suggested that selection based on plants with higher yield/plant, number of ear-bearing tillers per plant, number of tillers per plant and ear length is most advantageous because of comparatively higher heritability of these characters associated with greater genetic advance. This is in accordance with the findings of Agrawal (1967) in Pennisetum.

TABLE II. Estimates of phenotypic, genotypic and environmental variance, heritability and genetic advance in a 9 x 9 diallel set of pearl millet (*p. typhoides* (Burm.) S & H)

| Characters | Range | Mean | S.E. | Variance | | | CV | PCV | GCV | Herita- | GA | GA as% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | P | g | e | (%) | (%) | (%) | bility (in%) | | of mean |
| Plant height in cm. | 137.3—238.0 | 192.6 | 10.04 | 720.7 | 569.4 | 151.2 | 6.35 | 13.87 | 12.33 | 79.0 | 43.7 | 22.57 |
| No. of tillers/plant | 3.1— 7.4 | 5.4 | 0.47 | 1.6 | 1.2 | 0.4 | 10.80 | 23.45 | 20.81 | 78.8 | 2.0 | 37.67 |
| No. of ear-bearing tillers/plant | 1.7— 4.5 | 2.6 | 0 36 | 0.6 | 0.4 | 0.2 | 16.82 | 29.34 | 24.05 | 67.1 | 1.1 | 40.50 |
| No. of internodes per main shoot | 6.4— 8.7 | 7.6 | 0.42 | 0.7 | 0.4 | 0.3 | 6.84 | 10.63 | 8.20 | 59.0 | 1.0 | 12.75 |
| Ear length in cm. | 23.4— 48.7 | 35.0 | 1.62 | 31.3 | 27.9 | 3.9 | 5.66 | 16.12 | 15.10 | 87.7 | 10.1 | 28.90 |
| Ear girth weight in gm. | 5.6— 8.7 | 7.0 | 0.28 | 0.4 | 0.3 | 0.1 | 4.93 | 9.16 | 7.72 | 71.1 | 0.9 | 13.39 |
| 100-grain weight in gm. | 0.6— 1.4 | 1.1 | 0.07 | 0.0 | 0.0 | 0.0 | 7.45 | 14.89 | 12.89 | 76.9 | 0.3 | 23.18 |
| Yield per plant in gm. | 15.8— 54.7 | 28.6 | 2.03 | 149.4 | 143.2 | 6.2 | 8.70 | 42.72 | 41.83 | 95.8 | 23.9 | 83.61 |

Authors are highly thankful to pearl millet section I.A.R.I., New Delhi and ICRISAT, Hyderabad for providing the germplasm, Dr. Roshan Singh, Principal, Late Dr. S.P. Singh, and Dr. S.N. Chaturvedi, Head, Department of Botany, R.B.S. College, Agra for providing the facilities and encouragement during the preparation of this manuscript.

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