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Variability Studies in Proso Millet (*Panicum miliaceum* L.)*

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An investigation was carried out with 50 genotypes of proso millet to find out the information on the genetic variability present among them for nine economic traits. The genotypic coefficient of variation was high for penicle number and weight, and yield of grain and straw. As these characters have high heritability values coupled with high genetic advance, phenotypic selection for the improvement of these characters will be effective.

Proso millet (*panicum miliaceum* L.) is grown in India, Japan, South-Estern Russia and parts of Middle East where it is a cereal under rainfed conditions. It is grown in the U.S.A. as a forage crop. This millet hold promise for increasing grain production on the moisture-limited high plains and in providing developing contries with a more dependable protein supply for human consumption. Western countries, particularly Russia, have employed the techniques of exploitation of hybrid vigour, mutation and poly-ploidy breeding for improving both the quantity and quality of grain yield of proso millet. But in India, the breeding of this crop has largely followed conventional lines like mass and pure-line selection and studies on the biometrics of this crop are rather meagre.

Crop improvement depends on the availability of wide genetic variability in the base population. It may always be not possible to base selection on yield *per se* in improving the yielding ability of a genotype. Yield is of a complex nature in the sense that it is collectively influenced by various component characters which are in turn highly subject to environmental influence. It is thus difficult to conclude whether the observed variability is heritable or not. It, therefore, becomes essential to partition the observed veriability into heritable and non-heritable components by means of genetic parameters. In selection, or yield more emphasis should be placed on the attributes that show less variability due to environment. Hence partitioning the varience into phenotypic and genotypic components is of great value in planning and executing breeding programmes. The aim of the present investigation was to have information regarding the coefficients of variability, heritabilit

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and genetic advance of nine economic traits in proso millet which might be useful in developing suitable selection indices.

MATERIAL AND METHODS

Fifty genotypes of proso millet with dierse geographic orgin were chosen from the germplasm bank maintained at the Millets Breeding Station Agricultural College and Research Institute, Coimbatore. The experiment was conducted during *Kharif*, 1977 at the Millets Breeding Station in a randomised block design replicated thrice. Each genotype was sown in a ridge of 2.7 m spaced 40 cm apart. The plants were spaced at 15 cm with in a ridge. Five plants were selected at random for each type in each replication and observations on days to 50% bloom, plant height, number of panicles, length of primary panicle weight of primary panicle, number of primary rachis in the primary panicle, 100 grain weight, straw yield and grain yield were recorded, and the data analysed statistically.

The estimates of mean, variance and standard error were worked out by adopting standard methods (Panse and Sukhatme, 1961). The genotypic and phenotypic variances and genetic advance were calculated according to the formula given by Johnson *et al.*, 1955. The method suggested by Burton (1952) was used to compute phenotypic coefficient of variability (PCV) and genotyyic coefficient of variability (GCV). Heritability in broad sense (h^2) was estimated based on the formula of Lush (1940).

RESULTS AND DISCUSSION

The range, phenotypic and genotypic variance, PCV and GCV, heritability and genetic advance are furnished in Table I. The variance due to genotypes for all the traits were highly significant.

The highest GCV was obtained for straw yield (44.57) followed by panicle weight, grain yield and panicle number indicating their potentiality for variability among the types. This is in agreement with the findings of Natarajan *et al.* (1978) in proso millet, Abinesh Yadav and Srivastava (1976) in little millet, Dhagat *et al.* (1971) in kodo millet. Very low GCV estimates were obtained in the present material for panicle length and plant height. Abinesh Yadav and Srivastava (1976), also reported low GCV estimate for plant height in little millet. The present investigation is also in consonance with the findings of Natarajan *et al.* (1978) in proso millet and Gill and Randhawa (1975) in foxtail millet, where they reported that panicle length possessed low GCV.

None of the characters studied exhibited very low heritability values. Days to half bloom and panicle weigh possessed very high heritability values of 85.14 and 81.30 respectively ind-

cating that they are very less susceptible to the environment. This points to the greater role of genetic factor causing variation in these characters Abinash Yadav and Srivastava (1976) in little millet and Appadurai *et al.* (1977), in ragi also reported high heritability values for days to heading.

Heritability estimates along with genetic advance is more helpful for selectionthan heritability alone (Johnson *et al.*, 1955). In the present investigation panicle weight, straw yield, grain yield and panicle number possesed high heritability values coupled with high genetic advance which might be due to additive gene effects (Panse, 1957). Hence phenotypic selection may be practised for the improvement of these characters. Chaudhary and Acharya (1969) in ragi and Abinash Yadav and Srivastava (1976) in little millet also reported that the characters namely number of productive tillers, straw yield and grain yield might be improved throwth phenotypic selection.

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