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Genetic variability for morpho-physio traits in parental lines of pearl millet [*Pennisetum glaucum* (L.) R. Br.]

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SUMMARY

In present investigation attempt is being made to study genetic variability at both morpho - physiological level so as to access traits of parental lines of bajra to develop varieties and hybrids suitable for rainfed condition. Morphologically good parental lines should also be equally good in respect of physiological components of yield to achieve better stability/reliability in the performance of hybrid produced by them. If it is so, small fluctuation in morphological expression will not much affect the reliability in performance. Therefore, in addition to the A, B, R lines and inbreds were also subjected to test of variability.

Key words : Genetic variability, Morpho-physiological traits and *Pennisetum glaucum* (L.) R.

Pearl millet [*Pennisetum glaucum* (L.)R. Br.] is one of the most drought tolerant cereal crop grown in arid and semi-arid regions of the world. Crop is utilized as staple food, source of feed, fodder, fuel and for construction of huts in semi-arid and arid regions, where rainfed agriculture is primarily practiced. However, very few attempts have been made to study genetic variability jointly at physiological and morphological level and important physiological attributes such as chlorophyll stability index (CSI), stomata density, leaf area etc. needs to be involved to breed for rainfed condition both by selection and by exploitation of hybrid vigor because bajra is mostly grown in rainfed condition and it frequently suffers from intermittent droughts. Therefore, it becomes necessary to breed for rainfed bajra hybrids/composites having desirable physiological background which is represented by CSI, stomata density, leaf area etc.

MATERIALS AND METHODS

The present experiment was conducted with 35 genotypes including inbreds, maintainers, restorers and male sterile lines of bajra received from AICRP on bajra, Centre Dhule and were sown in randomized block design with three replications at Post Graduate Institute Farm, Mahatma Phule Krishi Vidyapeeth, Rahuri during *Kharif*, 2007. Two rows of 4.5 meter length were grown for each genotype in each replication, at the spacing of 45 x 15 cm.The analysis of variance was done as suggested by Panse and Sukhatme (1985). The phenotypic and genotypic variances were calculated by utilizing respective mean square value (Johnson *et al*., 1955). The genotypic and phenotypic coefficient of variation was calculated by the formula suggested by Burton and Devane (1953). Heritability in broad sense was estimated for each character as per the formula suggested by Hanson *et al.* (1956). Genetic advance was calculated by the formula suggested by Johnson *et al*. (1955).

RESULTS AND DISCUSSION

Lower CSI indicates stable performance of genotypes under water stress and high temperature. The parental lines *viz.*, DHBL-720, DHBL-726, DHBL-731, inbred DHBL-731 having lower CSI coupled with higher grain yield will certainly be useful to develop stress tolerant hybrids. These same lines also possessed low adaxial and abaxial stomata density indicating the possibility of good contribution of this inbred and parental lines to develop composite variety and hybrids for rainfed condition coupled with high level of grain yield. Two parental DHBL-724 and DHBL-731 shown judicious combination of stomata density (both adaxial and abaxial) lower than general mean but yield higher than the general mean. Male sterile counterpart of B line DHBL-724 can be used to develop hybrids with high grain yield and low stomata density. Inbred DHBL-731 can be used to develop composite/ synthetic with high grain yield and low stomata density. Significantly higher harvest index than general mean was noticed in two B-lines *viz.*, DHBL-724 and DHBL-728 indicating that their male sterile counterparts will be useful to develop hybrids having higher harvest index. The present results are in confirmation with the finding of Mahajan (1998) and Sagare (2001).Lower leaf area

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