Assessment of variability for morphological, physiological and biochemical traits in pearl millet under rice fallow condition

Avinash Vaishnav, CVCM Reddy, Lal Ahamed M and K Kiran Prakash
Department of Genetic and Plant Breeding, Acharya N G Ranga Agricultural University, Agricultural College,Bapatla-522101, Andhra Pradesh, India

ABSTRACT

Rice fallows represent an underutilized agro-ecological niche with significant potential for crop diversification, especially through resilient, short-duration cereals like pearl millet (*Pennisetum glaucum* L. R. BR.). In this study, 20 pearl millet genotypes (17 hybrids and 3 checks) were evaluated under rice fallow conditions during the *Rabi* season of 2024–25 to examine variability in morphological, physiological and biochemical traits. The experiment revealed highly significant differences across all genotypes studied, indicating substantial genetic variability. High heritability coupled with high genetic advance was observed for grain yield, dry fodder yield, biomass, crop growth rate (CGR), zinc and iron content indicating additive gene action and strong potential for direct selection. Genotypes such as 291A × BL90 and 04999A × 1012 were performed over the checks in productivity and micronutrient content, suggesting their utility in biofortification and short-duration cropping. Traits like plant height, test weight and chlorophyll stability index showed moderate GCV and PCV with high heritability, indicating moderate improvement potential, while days to maturity and total phenol content showed moderate heritability but low genetic advance, reflecting non-additive gene action. The results highlight the scope for developing nutritionally enriched, high-yielding pearl millet hybrids tailored to rice fallow ecologies, contributing to food and nutritional security through sustainable intensification.

Keywords:*Anti-nutritional factors, Heritability, Pearl Millet, Rice fallow and Variability*