

Genetic behaviour of rancidity traits in pearl millet (*Pennisetum glaucum* (L.) R. BR.)

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Pearl millet is a climate-resilient and nutritionally rich cereal, but rapid flour rancidity restricts utilisation. Genetic improvement combining high yield with low rancidity offers a sustainable solution. In the present study, 32 hybrids derived from eight cytoplasmic-nuclear male sterile lines and four restorers were evaluated across three environments. The results from the GGE biplot showed strong agreement (>70%) with conventional Line \times Tester analysis methodology. The lines L1, L3, L4, L6 and L8 exhibited favourable general combining ability for reduced rancidity, with L1 also showing high yield potential. Several heterotic crosses were identified for yield and low alcoholic acidity.

Keywords: Combining ability, enzymes, GGE biplot, heterosis, rancidity.

and cross combinations. Accordingly, the present study aimed to identify superior combiners, heterotic groups, and promising hybrids for high yield and reduced flour rancidity in pearl millet using the GGE biplot approach.

Materials and methods

Experimental material

The eight lines and four testers identified in earlier studies and contrasting for rancidity (Table 1) were crossed in L \times T mating design⁶ during the 2018 summer season to develop 32 hybrids. The 32 hybrids, along with parents, were evaluated at three locations during the 2018 rainy season.

Experimental setup