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Assessment of combining ability and gene action studies for grain yield and its component traits in Pearl millet [Pennisetum glaucum (L.) R Br]

R. Rasitha

Tamil Nadu Agricultural University, India

Objective: primarily focus on exploring combining ability, variance in yield, and its component traits to understand the nature and extent of gene action among lines, testers, and synthesized hybrids.

Methodology: Evaluation of 96 pearl millet hybrids synthesized by crossing 8 lines with 12 testers using a Line x Tester mating design. The experiment was conducted during the Kharif season of 2022 with two replications and included standard checks COH10 and 86M38.

Result: Analysis of variance for combining ability revealed that, significant amount of variation was present in all hybrids for studied traits. The contribution of lines to the total variance in hybrid was greater than tester. The ratio between GCA and SCA variance was less than one for all traits and it showed that non additive gene action was predominant and highlighting the potential of heterosis breeding to exploit hybrid vigor. Among the parents, ICMB 02777 and PT 6679 were identified as good combiners, showing positive gca effects and high mean performance for grain yield, test weight, single earhead weight, and single earhead threshed weight. The other parents viz., ICMB 02444, ICMB 93222, PT 6067, and PT 6476 were also recognized as good combiners for grain yield. Out of the 96 hybrids, the cross ICMB 02777 x PT 6679 exhibited significant positive heterosis along with high standard heterosis over both checks for grain yield, test weight and single earhead threshed weight. Additionally, ICMB 02444 x PT 6679, ICMB 93222 x PT 6067 were also recorded significant sca effect for grain yield per plant.

Conclusion: Identified hybrid combinations are of significant practical importance and have the potential for commercial utilization. They should undergo further assessment in extensive multi-location testing trials to confirm their suitability and performance in various environmental conditions.

Biography

Rasitha R is a PhD scholar in Tamil Nadu Agricultural university located in Coimbatore, Tamil Nadu state, India. She is working in pearl millet crop blast disease resistance breeding. Her thesis entitled "Genetics enhancement of grain yield and blast disease resistance in pearl millet. This paper is published as a part of research work to assess the combining ability and standard heterosis in newly synthesized hybrid combinations.