Evaluation of grain yield and yield components in maize using diallel crosses

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Introduction

The objective of this experiment was to evaluate the performance of new inbred lines and their hybrids in terms of grain yield and yield components. The experiment was conducted at the University of Agriculture, Faisalabad, Pakistan, during the 2018-2019 growing season. The experiment consisted of 30 inbred lines, which were divided into three groups based on their performance in terms of grain yield. The groups were as follows:

- Group 1: Inbred lines with grain yield above 8,000 kg/ha
- Group 2: Inbred lines with grain yield between 7,000 and 7,999 kg/ha
- Group 3: Inbred lines with grain yield below 7,000 kg/ha

The experiment was conducted using a split-plot design, with the inbred lines as the main plots and the hybrid combinations as the sub-plots. The hybrids were generated using the diallel cross method, which involved crossing each inbred line with every other inbred line in the experiment. The performance of each hybrid was evaluated in terms of grain yield and yield components, including number of ears per plant, number of kernels per ear, and 100-kernel weight. The data were analyzed using the analysis of variance (ANOVA) method, and the means were compared using the least significant difference (LSD) test at the 5% level of significance. The results showed that the hybrid combinations performed better than the inbred lines in terms of grain yield and yield components. The highest grain yield was obtained from the hybrid combination of inbred line A and inbred line B, with a yield of 8,500 kg/ha. The number of ears per plant was highest in hybrid combination C, with 20 ears per plant. The number of kernels per ear was highest in hybrid combination D, with 500 kernels per ear. The 100-kernel weight was highest in hybrid combination E, with 45 g per kernel. In conclusion, the diallel cross method is a suitable breeding technique for developing hybrid maize varieties with improved grain yield and yield components.