

DIALLEL ANALYSIS OF A SIMULATED POPULATION

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A 10x10 complete diallel design was used to analyse a character of a computer-simulated population. The main objective of the analysis was to evaluate F1 hybrids and compare their performances with the parental varieties. It involved the calculation of variances and covariances, maternal effects, combining abilities (.G.C.A. and S.C.A.), heterosis, identification of causes of heterosis and comparison of means.

High negative GCA effects were detected in parent 5 indicating the usefulness of this line in breeding for a lower scoring character, whereas, lines 9 and 4 exhibited high positive GCA, which in contrast could be used in breeding for a high scoring character. The parental means were shown to be highly correlated to the GCA values.

Four of the crosses showed evidence of maternal effects. High negative SCA effects were found in 5 crosses while 6 crosses gave positive SCA effects.

Of the 90 F1 hybrids, 51 showed significant heterosis over the better parent (P1). Cause of heterosis was partial dominance, indicating that recombinant inbred lines produced from such crosses should perform better than the heterotic hybrids. The best double cross predicted was estimated to be inferior to most of the F1 hybrids.

This study thus showed the usefulness of a diallel design to a plant breeder in evaluating performances of hybrids, causes of heterosis and gives an idea to the breeder as to what end-product he should aim for from any particular cross.