

Heterosis and Combining Ability in Barley

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A HALF diallel set of crosses comprising two local and four introduced barley varieties was used to estimate the heterosis and combining ability for grain yield per plant, plant height, peduncle length, stem diameter, number of nodes, flag leaf area and lodging .

Variances associated with general combining ability were found to be significant for all traits studied. Significant SCA variances were detected for grain yield/plant, plant height, peduncle length and lodging degree. The parental cultivar Giza 117 seemed to be the best combiner for grain yield and plant height. Gheng Tung expressed its superiority in GCA for peduncle length and lodging resistance. Baitori and Giza 119 were almost the best in GCA for stem diameter and number of nodes, respectively.

The most desirable hybrids were (Giza 117 X Baitori) for grain yield, (Giza 119 X Baitori) for plant height, and (Giza 119 X Gheng Tung) for peduncle length.

Significant positive correlation coefficients were obtained between mid-parent and F_1 hybrid means for; number of nodes, flag leaf area and lodging degree. Low positive correlation values were detected for grain yield, plant height, peduncle length and stem diameter. Heterosis in grain yield varied from 31% above the better parent to 59% below the mid parent.

Several methods are available to study the inheritance of quantitative traits . The diallel cross is of common usage in this respect for its power and versatility. Different approaches to the diallel analysis for estimating certain genetic parameters in terms of gene models have been developed. Total genetic variation is partitioned into the effects of general and specific combining ability. In this context, Sprague and Tatum (1942) defined general combining ability as the average performance of a line in hybrid combinations, and as such, general combining ability