

**GENETICAL ANALYSIS OF F<sub>2</sub> DIALLEL CROSSES IN BREAD  
WHEAT UNDER SALINE CONDITIONS OF  
WADI SUDR-SOUTH SINAI  
I. COMBINING ABILITY AND REMAIN HETEROISIS  
BY**

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**ABSTRACT**

A half diallel set of F<sub>2</sub> crosses involving five parents were used to estimate the type and relative amount of genetic variance components for days to heading, plant height (cm), number of productive tillers/plant, main spike length (cm), number of spikelets/main spike, number of grains/main spike, 1000-kernel weight (g) and grain yield/plant (g) of wheat. The data were genetically analysed according to the procedure developed by Griffing (1956 b) method 2 model 1.

Significant differences among the genotypes were detected for all the studied traits. The mean squares associated with general and specific combining ability (GCA and SCA) were highly significant for all the studied traits. The magnitudes of the ratios of GCA/SCA revealed that the additive and additive by additive types of gene action were the more important expression for all traits except main spike length, number of spikelets/main spike and grain yield/plant. For the exceptional traits, the magnitude of additive and non additive types of gene action were similar.

Estimates of  $\hat{g}_i$  effects revealed that the parental line (P<sub>3</sub>) seemed to be the best combiner for high grain yield. While, the parental line (P<sub>1</sub>) followed by Giza 157 exhibited significant negative  $\hat{g}_i$  effects for heading date. The highest desirable SCA effects were obtained in the following crosses: (P<sub>1</sub> x P<sub>2</sub>), (P<sub>1</sub> x P<sub>3</sub>), (P<sub>1</sub> x P<sub>4</sub>), (P<sub>1</sub> x P<sub>5</sub>), (P<sub>2</sub> x P<sub>4</sub>) and (P<sub>3</sub> x P<sub>5</sub>) for heading date and (P<sub>3</sub> x P<sub>5</sub>), (P<sub>2</sub> x P<sub>4</sub>), (P<sub>1</sub> x P<sub>5</sub>) and (P<sub>1</sub> x P<sub>2</sub>) for grain yield/plant.

For days to heading, the parental variety Giza 157 gave the earliest genotype. While, the P<sub>2</sub> x P<sub>5</sub> gave the highest grain yield/plant, but without significant superiority over those of P<sub>1</sub> x P<sub>4</sub> and P<sub>2</sub> x P<sub>3</sub>. Also, these crosses exhibited significant positive heterotic effects relative to mid- and better parent.

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Key words: Bread wheat - Diallel crosses - Saline conditions - Gene action - Remain heterosis - Combining ability.