SUMMARY

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This work was undertaken at the Experimental and Research Center Faculty of Agriculture, Moshtohor, during two successive seasons 1992 and 1993. The main objective of this study was to estimate genetic variance components and their interaction with planting date as well as some other genetic parameters in the synthetic variety "Cairo 1". In 1992 season, 100 rows of the variety "Cairo 1" were planted and one plant was randomly chosen as a male parent from each row and crossed into seven random plants used as female plants. At harvest seeds were taken from the first four females per each male which had sufficient seeds for evaluation. Twenty eight out of 100 planted rows were selected and represented 28 male groups (half- sib families) each had four females (full-sib families). Consequently, the total number of the full- sib families were 112. The twenty eight male groups each with four full sib families were randomly divided into four sets. Each set consisted of seven males each with four full- sib families.

In 1993 season, the four sets were evaluated in two different planting dates representing two different experiments. The experimental design was CRBD with three replications. The full- sib families from each set were randomized within each replication. The two planting dates were May 30 and July 10 for the early and late planting, respectively. Data were recorded on a plot basis in each planting date for grain yield g/plant, ear length, ear diameter, number of rows/ear, kernel row number, plant height, ear height, and silking date.

The analysis of variance for Design 1 mating scheme was applied as suggested by **Comstock and Robinson (1948)** to estimate the genetic components in each planting date as well as the combined data. Some

statistical and genetical parameters were computed ,i.e., mean (x), experimental error (o^2e), coefficient of variability (C.V.%), genetic variance components (additive and dominance variances) and their interaction with planting dates, heritability in narrow sense, phenotypic and genotypic correlation coefficient, and expected genetic gain from six methods of selection.

The obtained results could be summarized as follows:

1- The mean values of the early planting were higher than those of late planting for all studied traits except for silking date. The error variance (o^2e) was higher for late planting than the early planting for all traits except for grain yield/plant and kernel row number. Also, the coefficient of variability was much higher in late planting than early planting for all studied traits.

2- Mean squares due to planting dates were significant for all traits . Significant entries and entries x planting date interaction was obtained for all studied characters.

3- Male variances were significant for ear diameter, kernel row number, plant height, and silking date in the first planting date; for all traits except grain yield/plant in the second planting date; and for number of rows/ear, kernel row number, plant height, ear height, and silking date in the combined analysis. Female/male variances, significant differences were detected for all traits except for kernel row number in the early planting; and ear diameter and ear height in the second planting date.

4- The interaction effect of male variance x planting date was significant for ear diameter and kernel row number. The interaction effects of female x planting date were significant for all traits except for ear length and ear diameter.

5- The additive genetic variance was the predominant component in the inheritance of most studied traits.

6- Dominance genetic variance was negative and significant for most traits in both planting dates and their combined data.

7- The degree of dominance indicated that no to partial dominance was the major type of gene action prevailing for the loci controlling most of traits under study.

8- The additive genetic variance x planting date interaction was significant only for kernel row number, whereas the interaction between dominance genetic variance x planting date was significant for ear diameter, number of rows/ear, and plant height.

9- Low to moderate heritability values in narrow sense were obtained for grain yield/plant, ear length and ear height in the two planting dates and their combined analysis. Whereas, high estimates of h^2 were obtained for plant height, silking date in the three studied cases. For the other studied traits, high heritability values were obtained in both planting dates and their combined analysis.

10- Positive and significant phenotypic correlation coefficient was obtained between grain yield/plant and each of ear length, kernel row number, and silking date. The highest magnitude of genetic correlation was detected between grain yield /plant and kernel row number.

11- The expected genetic gain from selection was 8.60, 17.21, 5.72, 14.28, 21.94, 22.71, and 27.74 g/cycle for mass selection one sex and two sexes, modified ear- to- row, half- sib family selection, full-sib family selection, test cross selection, and S_1 selection, respectively. The S1 selection was the best method to improve the variety "Cairo 1" followed by test cross and full- sib family selection.