SUMMARY

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Two field experiments were conducted at the Experimental Research Center, Faculty of Agriculture Moshtohor, Zagazig University (Benha Branch), Kaluibia Governorate during 1999 and 2000 growing seasons to evaluate ten new maize hybrids and study the association between yield and other related characters. in maize in both seasons.

The tested new hybrids included six single crosses namely, Moshtohor-8 (M 8) x M 199, M 8 x M 200, M 46 x M 210, M 234 x M 56, M 183 x M 199 and M 8 x M 201 and four three- way crosses (M 210 x S.C. 10, M 373 x S.C. 10, M 344 x S.C. 10) and M 360 x S.C. 10). The parental inbred lines of these hybrids were developed in the maize breeding program at the Faculty of Agriculture, Moshtohor, Zagazig University (Benha Branch). The three check varieties used in this investigation were : S.C. 10, T.W.C. 310 and Giza-2 which were developed by the Maize Research Section of the Agricultural Research Center, Giza Egypt. The experimental design was Complete Randomized Block Design with four replications in both seasons. Data recorded on date of silking, plant height (cm), ear height (cm), ear length (cm), ear diameter (mm), number of rows/ ear, number of kernels/ row, 100-kernel weight, shelling percentage, grain yield (g/ plant) and grain yield (kg/ fad). Data were analyzed separately for each season and combined analysis over both seasons according to (Steel and Torrie, 1960). The simple correlation coefficient

matrix between grain yield/ plant and other studied traits was estimated according to Snedecor and Cochran (1981). Correlation coefficients were used to calculate path coefficients. Path coefficient analysis as suggested by Dewey and Lu (1959) was used to estimate the relative importance of characters contributing to yield. Factor Analysis was used to establish the dependence relationship between all studied variables (Cattell, 1965).

The obtained results could be summarized as follows :

Analysis of variance and mean performance :

1- Significant season mean squares were obtained for ear height, ear length, ear diameter, number of grains/ row, grain yield/ plant and grain yield kg/ fad.

2- Highly significant genotypes mean squares were detected for all traits in separate season as well as the combined analysis.

3- Two hybrids namely M 210 x SC 10 were significant earlier than the other genotypes recording 62.88 and 62.75 days, respectively.

4- Two genotypes namely, M 46 x M 210 (247.1 cm), M 8 x M 201 (248.0 cm) were significantly shorter than all genotypes under study .

5- Three genotypes had the shortest ear position with significant difference as compared with the three check varieties in both seasons and their combined data .

6- Hybrid M 8 x M 200 had the highest values for ear length without significant difference from SC 10 being 20.10, 21.42 and 20.76 cm in 1999, 2000 seasons as well as the combined data, respectively.

7- Genotype M 183 x M 199 (48.25 mm) was significantly superior for ear diameter over all other genotypes including the three checks followed by the cross M 8 x M 200 (48.13 mm) and M 8 x M 199 (47.38 mm).

8- Genotype M 183 x M 199 (14.44) significantly surpassed other tested genotypes for number of rows/ ear. The second best hybrid for this trait was M 46 x M 210 with an average of 13.77.

9- Genotype M 183 x M 199 had the highest value for number of grains/ row in the first (41.30), second season (44.00) and the combined averaged (42.65) without significant differences from the two checks SC 10 and TWC 310.

10- Genotype M 183 x M 199 was at the top for 100 grain weight followed by M 8 x M 199 and M 8 x M 200 recording 39.00, 38.50 and 38.25 g in the combined data, respectively.

11- Genotype M 8 x M 199 ranked the first for shelling percentage in the second season and the combined data being 86.81 and 85.79 %, respectively, followed by the cross M 183 x M 199 which recorded 85.63 and 85.25 % for the respective cases.

12- The crosses M 183 x M 199, M 8 x M 199 and M 8 x M 200 produced the significant highest grain yield/ plant

being 200.o, 198.5 and 192.0 g in the first season; 216.3, 213.8 and 211.5 g in the second season and 208.1, 206 other genotypes including the best check (SC 10).1 and 201.8 g in the combined data, respectively, as compared with other genotypes including the best check (SC 10).

13- Genotype M 183 x M 199 produced the significant highest grain yield/ fad compared with other genotypes recording 4305.0, 4821.25 and 4563.13 kg/ fad in the first, second season as well as the combined data, respectively.

Correlation and Path Coefficient Studies :

14- Highly significant positive phenotypic correlation coefficient were detected between grain yield per plant and each of ear length, ear diameter, number of kernels/ row and weight of 100- kernels. The association between silking date and each of plant height, ear height, ear length, ear diameter, number of rows/ ear, number of kernels/ row, and weight of 100- kernel were negative and not significant. Highly significant positive correlation coefficients were found between ear length and both ear diameter and number of kernels/ row. Highly significant positive correlation coefficients were obtained between ear diameter and each of number of rows/ ear, number of kernels/ row, weight of 100- kernel. Significant positive correlation coefficient was obtained between number of rows/ ear and weight of 100- kernel. Correlation coefficient between number of kernels/ row and weight of 100- kernel was positive and significant

15- The nine traits and their interactions as sources of total grain yield variation were responsible for 98.13 %. The residual effects of the other grain yield components not included in the present study accounted for 1.87 % .

16- The main sources of grain yield arranged according to their relative importance were : ear height (13.36 %), ear diameter (12.06 %), joint effect of plant height with ear height (11.21 %), joint effect of ear diameter with 100-kernel weight (8.28 %), joint effect of ear height with ear diameter (7.68 %), weight of 100- kernel (5.42 %), joint effect of ear diameter with number of kernels/ row (5.52 %), plant height (4.87 %), joint effect of ear diameter with number of rows/ ear (4.53 %), joint effect of ear height with number of kernels/ row (3.05 %), joint effect of number of kernels/ row with 100- kernel weight (2.47 %), joint effect of plant height with 100- kernel weight (2.35 %), joint effect of number of rows/ ear with 100- kernel weight (2.07 %), number of kernels/ row (1.84 %), joint effect of plant height with ear diameter (1.67 %), joint effect of ear height x 100 kernel weight (1.51 %), number of rows/ ear (1.30 %) and joint effect of ear diameter with shelling percentage (1.17 %) .

Factor Analysis

17- The factor analysis divided the 9 variables affecting total grain yield/ plant into three groups or factors. The three factors accounted for 71.10 % of the total variability in the dependence structure.

18- The first factor was more important than the two others factors since it accounted for 37.70 % and consisted of ear length, number of kernels/ row, ear diameter, shelling percentage and 100- kernel weight.

19- Factor 2 consisted of two variables namely, plant height and ear height and accounted for 19.90 % of the total variability of dependence structure.

20- Factor 3 consisted of two variables, i.e., silking date and number of rows/ ear. This factor accounted for 13.60 % of the total variability of dependence structure