genetic studies on maize (zea mays,l)

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The aim of the present investigation was to determine the heterosis and types of gene action and their interaction with seasons (Environments) for growth and yield characteristics, i.e. tasseling andsilking dates, ear and plant heights, leaf area, leaf angle, ear husk, stemdiameter, number of leaves per plant, number of ears per plant, ear length, ear diameter, number of rows per ear, number of kernels per row, 100- kernels weight, grain yield per plant and shelling percentage. To achieve this target F] and F2 of the half diallel cross between seven parental inbred lines namely Moshtohor 75, M33,M 17 A, M118 B, M122 A, Ml14 D and Giza 2210 representing wide range of variabilityin most of the studied traits were utilized. In 1994 season, crossing was made with all possible combinations among the seven parental inbred lines without the reciprocals and evaluated in 1995 season with three check varieties (including single cross 10, three way cross 310 and Giza 2) in arandomized complete block design with three replications. In 1996 season, two experimentswere conducted, the first involved the parental inbred lines, their twenty one possible crosses and three check varieties, and the second included the parents and the F2 crosses.,, Data were recorded on 10 and 30 individual plants, chosen at random from each plot for F1 and F2 , respectively. Analysis of variance was performed for the studied traits in each season and then a combined analysis was carried out whenever homogeneity of error variance was realized. The data were genetically analyzed following the proceduresoutlined by Griffing (1956), Hayman(1954 a and b) and Jinks (1954). The obtained results can be summarizedas follows: 1) Botanical attributes: I. Analysis of variance, means and heterosis : A- F1 - generation: 1- Season mean squares were significantfor all traits except for plant height. 2- Significantgenotype mean squares were detected for all traits in the separate seasons as well as the combined analysis. Significant genotype by season interaction mean squares were obtained for ear and plant heights and leaf area. 3- Significantparents mean squares were found in all traits. Insignificant mean squares of interactions between parental inbred lines and seasons were detected for all traits. 4- Moshtohor 118B behaved as the top of the tested inbred lines forear husk, stem diameter and number of leaves per plant. The parental inbred line Giza 221D behaved as the earliest one for tasseling and silking dates. 5- Significant cross mean squares were detected for all the studied traits. whereas, significant mean squares due to interaction between crosses and seasons were detected for ear height, plant height, and leaf area. The earliness of tasseling and silking dateswas shown by cross (P2 X Ps), (P2 X P6), (P2 X P7) and (Ps x P6) in both seasons as well as the combined analysis. 6- Mean squares for parent vs. crosses were significant for all traits. Insignificant interaction between parents vs. crosses and seasonswas detected for all traits. For tasseling date, nine, six and eighthybrids expressed significant negative heterotic effects relative tobetter parent in the first, second season as well as the combinedanalysis, respectively. For stem diameter, five crosses exhibitedsignificant positive heterotic effects relative to the better parent inthe second season: B- F2 - generation:1- Mean squares for genotypes, parents , F2 crosses and parent vs. crosses were significant for all the studied traits except mean squares of parents and parents vs. crosses for leaf angle. 2- The most desirable remaining heterotic effects were presented by two crosses for tasseling date, four crosses for silking date, eleven crosses for leaf area, one cross for stem diameter and three crosses for number ofleaves per plant.