

## ABSTRACT

Thirty four maize (*zea mays* L.) lines were artificially infected by *Fusarium moniliforme* caused ear rot disease at Ismailia Research station, ARC, in 2002 growing season; where six lines were selected showing 3 patterns of reaction to disease. At 2003 season, all possible diallel F<sub>1</sub> crosses without reciprocals were made among the five selected inbred lines. At 2004 season parents and 15F<sub>1</sub> hybrids were evaluated under artificial infection in RCBD. Two characters expressing resistance to ear disease caused by *F. moniliforme*, i.e., percentage of rotten ears and intensity of ear rot damage were determined. The results revealed wide variations among parents and their F<sub>1</sub> hybrids for disease intensity and percentage of rotten ears the hybrid Sids-7×Gm-18 showed the best performance for disease resistance and high grain yield. Negative heterosis were detected for all hybrids except Gm-14 × Sids-63 hybrid for disease intensity and percentage of rotten ears. The other characters were positive heterosis.

Mean degree of dominance  $(H1/D)^{1/2}$  indicated the presence of over dominance for all studied characters. As well as, the proportion of dominant and recessive genes in the parents were unequal with more dominant than recessive genes for all traits except no. of husk cover/ear. The directions of dominance were disease resistance dominant over susceptible gene as intensity and percentage of rotten ears. But others, i.e., no. of husk cover/ear and grain yield were to high than the low values. Estimates of type of gene action showed that the additive and dominance gene effects plays the major role in the genetic

control of disease intensity, percentage of rotten ears and no. of husk/ear, while dominance effects play an importance role in the inheritance of total content of phenol and grain yield/plant. Estimates of heritability in broad sense were very high for percentage of rotten ears and disease intensity (99.9% and 92.6% respectively); however narrow sense heritability estimates were low to moderate (39.2 and 46.6 respectively). Significant negative correlations were detected between total phenol content, no. of husk cover / ear, no. of closed ears and disease criteria. Significant positive heterosis were detected for grain yield, no. of kernel/row, ear length and ear diameter. Insignificant correlations were detected between grain yield and its attributes except no. of kernel/row and disease criteria.

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