

ESTIMATES OF COMBINING ABILITY FOR GRAIN YIELD AND OTHER ATTRIBUTES IN MAIZE

M.E.M. Abd El Azeem, M.A. Abd El Moula and A.E.M.K. El-Galfy
Maize Res. Prog, Field Crops Research Institute, ARC, Egypt.

(Received: Apr. 14 , 2010)

ABSTRACT: *Twelve yellow maize inbred lines in the S₃ generation were topcrossed to three inbred line testers, viz. Gz638, Gz650, and Gm1021 in 2007 season. Thirty-six entries topcrosses in addition to two check hybrids; SC.155 and SC.162 were evaluated at Sakha, Gemmeiza, and Sids Agric. Res. St, ARC in 2008 for no. of days to 50% silking, plant and ear height, resistance to late wilt disease and grain yield. Mean squares due to crosses, lines (L) and testers (T) were significant for all traits studied across locations, except for days to 50% silking of testers and ear height of lines, revealing that great diversities were existed among testers and lines. Mean squares of the lines x testers interaction were significant for all the traits studied, indicating that the lines (females) had differed in order of performance in crosses with each of the testers (males). Highly significant differences were detected among locations for all traits studied, indicating that the three locations differed in their environmental conditions. The interactions of locations (environments) with crosses, lines and testers were significant for all the traits studied, except for ear height of L x Loc and days to 50% silking and resistance to late wilt of T x Loc. These significant interactions with locations are mainly attributed to the different ranking of genotypes from location to another. The interaction of L x T x Loc was significant for all the traits studied except of days to 50% silking and resistance to late wilt. These results revealed that the crosses between lines and testers were different from one location to another. The highest GCA effects for grain yield were recorded for lines L5 and L12. These lines should be utilized in breeding programs to be used as sources for developing high yielding hybrids Crosses L1 x GZ650 , L2 x GZ638 , L3 x GM1021 , L5 x GZ638 and L11 x GZ650 showed significant positive SCA effects for grain yield. The σ^2_{SCA} variances was larger than that of σ^2_{GCA} for days to 50% silking, plant height and late wilt resistance. These results indicate that the non-additive gene effects were more important than additive gene effects in the inheritance of these traits. But σ^2_{GCA} was larger than σ^2_{SCA} for ear height and grain yield. Furthermore, the magnitude of $\sigma^2_{SCA} \times Loc.$ interaction was greater than $\sigma^2_{GCA} \times Loc$ interaction for all the traits studied except, for days to 50% silking, indicating that the non-additive gene action interacted more with the environmental conditions than the additive component for this trait.*

Key words: *Maize, Topcrosses, Combining ability, Gene action.*