ABSTRACT

Six yellow flint maize genotypes, consisting of four inbred lines and two composite varieties were utilized in making fifteen crosses and fifteen reciprocal crosses in a complete diallel mating system. These thirty cross combinations and six parental genotypes along with two checks (one commercial hybrid and one newly developed composite) were evaluated in a complete randomized block design under rainfed situation during kharif, 2001. Observations were recorded for seventeen quantitative characters over three replications. The mean observation data were used for analysis of variance, heterosis estimation, diallel analysis (Hayman) and combining ability following Griffing’s method 1 and model I.

Analysis of variance revealed significant difference for fourteen out of seventeen characters studied. The three characters, namely number of husk/cob, cob length and shelling % only were non-significant. Reciprocal crosses showed significant difference for fourteen characters.

Two crosses, namely, Suwan 1 x CI 4 and Suwan 1 x KDMI 4 expressed positive heterosis over both the checks for grain yield. In the Hayman's diallel analysis the total sum of squares was partitioned into various components, a (additive), b (Non-additive which was subdivided into $b_1$, $b_2$ and $b_3$), C (Maternal) and d (reciprocal differences other than c).

Graphical analysis (Vr, Wr) was carried out only for the twelve characters which were significant for “b” values. The components of genetic variation and gene action through Hayman’s numerical analysis for each of the twelve characters have been discussed. The estimated value of dominance variance ($H_1$) was significant and greater than the
additive variance (D) (non-significant) for grain yield, indicating there by that the grain yield was predominantly under the influence of dominance type of gene action. The heritability estimate, in narrow sense, for grain yield was also low.

The estimated variance components of combining ability revealed that the magnitude of sca variance was higher than that of the gca variance for most of the characters except for stem diameter, ear leaf width, days to 50% tasseling, days to 50% silking, cob diameter and 100 grain weight. Suwan 1 showed highly significant positive gca effect for grain yield. The cross Suwan 1 x KOMI 4 showed significant and positive sca effects for grain yield. But the cross Suwan 1 x BM 1 showed significant and negative sca effects for grain yield. None of the crosses was found to give significant reciprocal effects for grain yield.