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# Combining ability for yield and maturity traits in elite inbred lines of maize (*Zea mays* L.)

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## ABSTRACT

Line x tester analysis involving 15 females and 3 males from diverse origin was carried out in maize inbreds. Analysis of variance and estimates of the components of genetic variance revealed that significant differences existed among the lines and lines x testers for all the traits. Based on estimated, higher magnitude of $s^2$ sca in relation to $s^2$ gca implied the greater importance of non-additive gene effect than additive gene effect for all traits thus favour by hybrid production. None of the parents/crosses was found to be good general/specific combiner for all traits, 1391, 151A and 142A were good general combiners for grain yield. Crosses viz., 139A x 153A, 106C-2 x C-6, 106C-1 x Super 1 and 106C-1 x 153A showed significant and highest sca effects as well as better parent heterosis. Such crosses are suited to be used directly in hybrid production programmes in order to utilize the hybrid vigour. The promising crosses were the result of High x Low or High x Medium general combiners as parents.

**Key words :** Combining ability, Heterosis (*Zea mays* L.).

## INTRODUCTION

Maize (*Zea mays* L.) is the third most important cereal crop in India next to rice and wheat. It is joint significant importance on account of its growing demand for diversified end uses, especially feed and industrial uses. Hybrid vigour in maize has assumed tremendous significance in view of spectacular yield increase achieved through maize hybrid. The grain yield is the primarily trait targated for improvement in both favourable and unfavourable environments from its present level. In unfavourable environment early maturing genotypes may play an important role for improvement in grain yield. The present investigation was therefore, undertaken to assess both gca and sca for maturity and yield contributing traits and identify best general combiner inbred lines and also the best hybrids with respect to sca effects and economic heterosis for grain yield.

## MATERIALS AND METHODS

Fifteen diverse, vigorous and productive maize inbred lines viz., 102D, 102A-2, 106 B, 106C-1, 132C-2, 132C, 139A, 139B, 140 E-2, 141 B-1, 142 A, 146B, 147C, 150B and 151A coded as $L_1$, $L_2$, $L_3$, $L_4$, $L_5$, $L_6$, $L_7$, $L_8$, $L_9$, $L_{10}$, $L_{11}$, $L_{12}$, $L_{13}$, $L_{14}$ and $L_{15}$ three well adapted of varying genetic base viz., $T_1$ ($C_6$) composite, $T_2$ (Super-1) synthetic and $T_3$ (153A) inbred line were crossed in line x tester design during kharif 2004 at K.D. Research Farm SKUAST-K, to generate 45 hybrids. (Table 2) and three well adapted testers of varying genetic base viz., $T_1$-(C-6), $T_2$-(Super-1) $T_3$ (153A) were crossed in line x tester design during kharif 2004 to generate a total of 45 hybrids. These 45 hybrids with 18 parents were planted in randomised block design with 3 replication in a single row plot of 5 meters length having 60 x 25 cm crop geometry during kharif 2005 at K.D. Research Farm SKUAST-K, . The data was recorded on maturity and yield contributing traits on ten randomly selected competitive plants. Heterosis was calculated as per standard procedure and combing ability analysis was done according to procedure of Kempthorne (1957).

## RESULTS AND DISCUSSION

Analysis of variance revealed highly significant mean square differences for all the traits among cross (Table 1) reflecting thereby presence of adequate genetic diversity in material chosen for study. Mean square due to parent v/s crosses were also significant for most traits thus confirming result of Choudary and Choudhary (2002). Analysis of variances for line x tester effect was significant for all the traits. Similarly line effects revealed significant mean squares for all traits except ear height. Variance due to sca was significant for all the traits whereas variance due to gca was also significant for most traits except days to 50 per cent anthesis, ear girth and number of kernel rows per $ear^{-1}$. Based on the estimates higher magnitude of $\sigma^2$gca in relation to $\sigma^2$gca implied the greater importance of non-additive gene effects for maturity related traits, grain yield and its component traits. Prevalence of greater magnitude of non additive genetic component of variance relative to additive in present study

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