

## Genetic analysis for maturity and height traits in maize (*Zea mays* L.)

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### SUMMARY

Combining ability was estimated for maturity and height for different five traits in maize using 8 x 8 half diallel crosses. General and specific combining ability variances were highly significant for all the traits. Both additive and non-additive gene actions played an important role for the inheritance of all the components. Inbreds GWL-3 and GWL-8 were observed to be superior having significant negative gca effects for all the characters. The cross CML-264 x GWL-2 possessed good sca effects in desirable direction for days to 50 % tasselling, silking, ear height and days to 75 % dry husk.

**Key words :** Diallel, Combining ability, *Zea mays* L.

Combining ability is one of the most effective tool for deciding the appropriate parents for new crossing programmes. It is also effective in choosing the appropriate breeding approach for handling a crop to develop new variety. Maturity plays an important role in the acceptance of a maize variety by the farmers under the wide range of cropping systems whereas, application of fertilizers, particularly chemical ones, and ultimately grain yield are strongly associated with plant height trait. In the present study, general and specific combining ability analysis and estimates of gene actions were find out for eight inbreds of maize and their 28 F<sub>1</sub>'s.

### MATERIALS AND METHODS

Eight white kernel maize inbreds viz., CML-260, CML-264, GWL-2, GWL-3, GWL-8, GWL-12, GWL-14 and GWL-17 alongwith their 28 F<sub>1</sub>'s, were grown at Agronomy Farm, Anand Agricultural University, Anand during Rabi 2006-07. The experimental materials were grown in randomized block design with three replications in two rows of 5 m. length having inter and intra row spacing of 60 cm and 20 cm., respectively. Five plants from each plot were randomly selected for recording the different observations of plant and ear height. Observations on days to 50% tasseling, silking and days to 75% dry husk were recorded on plot basis. Combining ability analysis was carried out according to Model- I,

Method- II proposed by Griffing (1956).

### RESULTS AND DISCUSSION

Analysis of variance revealed that presence of significant amount of variability among the parents and crosses for all the traits.

The analysis of variance for combining ability observed highly significant for gca and sca for all the characters under study (Table 1) suggesting thereby, importance of both additive and non-additive gene actions for the inheritance of these characters as reported by Nagda *et al.* (1994), Nagesh Kumar *et al.* (1999) and Mahto and Ganguli (2003). However, the component of variation (M.S.S) due to gca was higher than that due to sca, indicating the preponderance of additive gene actions for all the attributes. It infers that the experimental materials may be more efficiently exploited by adopting any population improvement method for composite development. These findings are in close agreement with those of Singh (1991) and Vasal *et al.* (1993) for days to silking, plant height and ear height.

Estimates of gca effects (Table 2) indicated that parents CML-264 and GWL-12 recorded high negative gca effects for majority of the traits; whereas, parent GWL-14 had high significant negative gca effects only for days to 50% tasseling and days to 75% dry husk. The parents GWL-3 and GWL-8 were observed to be superior, having significant negative gca effects for all the characters. These finding suggest that these two parents GWL-3 and GWL-8 may be utilized in hybridization programmes for improving maize genotypes with respect to earliness and dwarfness.

Estimates of sca effects (Table 3) showed that cross CML-264 x GWL-2 had significant negative sca effects for days to 50% tasselling, silking, ear height and days to 75% dry husk. The crosses CML-260 x GWL-2 and

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