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RESEARCH ARTICLE

# Study on combining ability in cucumber (*Cucumis sativus* L.)

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## SUMMARY

The $F_1$ and $F_2$ progenies of a 8x8 parent diallel cross (excluding reciprocals) of cucumber (*Cucumis sativus* L.) were analyzed for combining ability in respect of ten attributes. Analysis of variance for combining ability revealed highly significant GCA and SCA variances for all the characters studied in $F_1$ and $F_2$ generations except fruit length in $F_2$ generation indicating the importance of both additive and non-additive gene action for inheritance of these attributes. However, the estimated values of GCA variance were lower than the SCA variance for all the traits in both $F_1$ and $F_2$ generations indicating the predominance of non-additive genetic variance. The parent C 99-12 was best general combiner for yield/vine, days to first male flower, fruit length, fruit weight and vine length in both the generations. The cross combinations EC 43342 x C 99-10, EC 43342 x C 98-6 and PCUC 15-1 x C 98-6 were observed as good general combiners for yield/vine in both $F_1$ and $F_2$ progenies. Biparental mating followed by recurrent selection may be utilized to exploit both additive and non-additive gene actions and to obtain transgressive segregants in advanced generations for characters governed by such type of gene action.

**Key Words :** Combining ability, Gene action, Diallel analysis, Cucumber

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Cucumber (*Cucumis sativus* L.) is an important crop of cucurbitaceae family. Its cultivation is most popular in north and north-east region of India, *i.e.*, Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal. It has an important place in human diet in the form of green vegetables and salad as well as in the form of medicine. It is a monoecious crop. Therefore, a very high degree of cross pollination takes place. The diversity in this crop is also quite meagre. As in other crops the selection of suitable parents and cross combinations are necessary for genetic improvement. The knowledge on the gene action for expression of various quantitative characters is very essential in deciding the breeding methods for genetic improvement. Combining ability leads to identification of parents and cross combinations with high GCA and SCA effects, respectively for crop improvement program. It also helps getting idea about the nature of gene action for a particular character. In a heterosis breeding program the breeder is often confronted with problems in choosing desirable parents. Diallel analysis provides information about the components of genetic variation and helps the breeder in the selection of desirable parents for hybridization and in deciding a suitable breeding procedure for the genetic improvement of various quantitative traits. The present study aims to identify best parent and cross combinations as well as to know the nature of gene action for various attributes.

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## MATERIALS AND METHODS

Eight genotypes of cucumber, namely, PCUC 15, EC 43342, PCUC 15-1, CHC 2, BIHAR 1, C 99-12, C-98-6 and C 99-10 were used to make all possible crosses excluding reciprocals. The experiment material consisting 8 parents, 28 $F_1$s and 28 $F_2$s was sown in randomized block design with three replications at Department of Vegetable Science, C.S. Azad