

Combining ability through line x tester analysis in cucumber (*Cucumis sativas* L.)

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ABSTRACT

Thirty five F_1 hybrids of cucumber involving 12 parents were studied to workout the combining ability for yield and its contributing traits during April, 2005. Significant differences in the parents indicated that majority of the parents had diversity for total yield per vine, total number of fruits per vine, fruit length, vine length, fruit diameter, average fruit weight, number of branches per vine, days to first female flower appears, node number of at which first female flower appears. Considering combining ability values, parents BGD, DWD-2, GBGL and Pointsette found to be superior for total fruit number per vine, parents BGD, DWD-2 and Vejudra Dosa for total fruits yield per vine, parent BGD, white long, Vejudra Dosa and BGBL for average fruit weight and parents BGD, PAU-1 and ARABL for high vigorous plants. The cross BGD x Hot season showed significant positive sca for total fruit yield per vine and total number of fruits per vine.

Key words : Cucumber, Ability, Combining, General, Specific

Cucumber (*Cucumis sativas* L.) is one of the most popular vegetables of the family cucurbitaceae, with a chromosome number $2n=14$. In spite of the extensive cultivation and consumption cucumbers have not been taken up for systematic research work in order to understand the genetic architecture and endeavour in an improvement programme. Many important features of cultivars crops are not associated with discrete mendelian traits but are of a continuous or quantitative nature, yielding ability is a prime example of such a trait and is of obvious importance. Yield and many factors that affect it are subject to considerable environmental influence. Line x tester analysis is a method which helps to evaluate inbred line performance in F_1 combination, using combining ability.

The combining ability analysis gives useful information regarding the selection of parents in terms of the performance of their hybrids. The concept of combining ability in terms of genetic variation was first given by Sprague and Tatum (1942) using single crosses in maize. Information on the relative importance of general (GCA) and specific combining ability (SCA) is of value in breeding programmes for species which are amenable to the development of F_1 hybrid. Such basic information on combining ability in cucumber would aid the breeder in developing hybrid cultivars (Tasdighi and Baker, 1981). In this contribution, an attempt has been made to study the combining ability of parents and F_1 hybrids through line x tester analysis utilizing the monoecious inbreds collected from indigenous sources.

MATERIALS AND METHODS

Twelve genetically pure diverse genotypes/lines namely GBGL, Vejudra Dosa, KNPL, BGD, ARABL as lines Hot Season, white cucumber, Hyderabad cucumber, PCO-1, PCL-1, PCB-1 and PAU-1 as testers were used to develop 35 F_1 s. All the crosses and their parents were sown in a randomized block design with two replications during April 2005 at College of Agriculture, Bheemaranagudi, taluk-Shahapur district, Gulbarga. The crop was planted in single rows of 4.5 meter length with a spacing of 1.5 x 0.5 m. Ten plants were maintained in each row/plot. The observations were recorded on five randomly selected plants for nine economically important characters namely days to first female flower, node number at which first female flower appears, vine length (cm), fruit length (cm) fruit diameter (cm), average fruit weight (g), number of branches per vine, number of marketable fruits per vine, total number of fruits per vine, total fruit yield per vine (kg). The data were analyzed for combining ability based on the procedure developed by Kempthorne (1957).

RESULTS AND DISCUSSION

The analysis of variance (Table 1) showed highly significant differences for all the characters indicating the existence of sufficient diversity in the material tested. Highly significant differences were noted for the parents in all the attributes revealing that, the majority of parents too showed diversity for fruit yield per vine, number of fruits per vine, average fruit weight, fruit diameter, fruit length, number of branches per vine, vine length, days to