

Combining ability for pod yield and its components in groundnut [*Arachis hypogaea* (L.)]

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ABSTRACT

Combining ability was studied in 8 x 8 diallel set (excluding reciprocals) in groundnut. Analysis of variance for gca and sca were highly significant for all the traits viz., 100-kernel weight, number of pods per plant, sound mature kernel, shelling outturn, kernel yield per plant, pod yield per plant higher magnitude of σ^2_{gca} and σ^2_{sca} indicating preponderance of non-additive gene action for all the traits studied. The parents GG 5 for number of pods per plant, sound mature kernel, shelling outturn, kernel yield and pod yield per plant, while GG 7 for 100-kernel weight, sound mature kernel, kernel and pod yield per plant were good general combiners. The best specific combiner for pod yield and its components was GG 5 x JL 24 followed by SB XI x JL 24.

Key words : Combining ability, Gene action and groundnut

INTRODUCTION

Groundnut is commercially cultivated crop and plays an important role in the economy of several countries. India is the chief producer of groundnut in the world and it accounts for about 40 per cent of the world area and 30 per cent of the world production. A choice of appropriate parents to be used in the hybridization programme is very essential to bring about the desired recombinants. The breeding strategy to be adopted for the improvement of a crop depends primarily on the nature of gene action involved in the expression of quantitative traits of economic importance. Diallel analysis helps in identification of parents with general combining ability (gca) effects and in locating cross combinations possessing high specific combining ability (sca) effects. Therefore, the present investigation has been undertaken to get information on combining ability of eight Spanish bunch genotypes of groundnut in respect of pod yield and its components.

MATERIALS AND METHODS

A set of 8 x 8 diallel crosses (F_1) of groundnut excluding reciprocals was made during Summer-2002 and selfed F_1 generation during *khariif*- 2002 for advancing the generation. Only F_2 crosses were evaluated along with their parents (GG 2, GG 5, GG 7, TG 19A, SB XI, FeESG 10, JL 24 and Chico) in a Randomized Block Design with three replications at Main Oilseeds Research Station, Junagadh Agricultural University, Junagadh during summer-2003. Each entry was sown in a single row plot of 3.0 m. length with row-to-row and plant-to-plant spacing of 30 cm. and 10 cm., respectively. Observations

were recorded on five randomly selected plants from each plot for pod yield and its components (Table 1). Combining ability analysis was made following method-2, model – I of Griffing (1956).

RESULTS AND DISCUSSION

Analysis of variance for combining ability revealed the variance due to gca and sca were highly significant for all the six traits (Table 1). This indicated existence of genetic variability among parents included and role of both additive and non-additive gene effects in the inheritance of these traits. The components of variance revealed that σ^2_{gca} was lower than σ^2_{sca} for all the characters indicating preponderance of non-additive gene action in the inheritance of all the characters. The results are in general accordance with findings of Basu *et al.*(1986), Upadhyaya *et al.*(1992) and Mathur *et al.*(2000).

The estimates of gca effects of parents for all the six characters are presented in Table 2. An overall appraisal of gca effects of the parents used in the present study indicated that in general, none of the parents was a good general combiner for all the traits studied. However, parent GG 5 was a good general combiner along with high *per se* performance for number of pods per plant, sound mature kernel (%), shelling outturn (%), kernel yield per plant and pod yield per plant ranked first, which can be utilized in plant breeding programme as one of the parents to develop high yielding genotypes. GG 2 was also a good general combiner for number of pods per plant, sound mature kernel (%), shelling outturn (%) and kernel yield per plant. GG 7 was good general combiner for 100-kernel weight, sound mature kernel (%), kernel

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