

Heterosis and Combining Ability for Yield and its Components in Field Beans (*Vicia faba*, L.)

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A diallel analysis for number of seeds per pod, number of pods per plant, 100-seed weight and seed yield per plant of six cultivars of field bean was studied. Variances associated with general combining ability were found to be significant for all traits except for the number of pods per plant. With the exception of number of seeds per pod, significant SCA variances were detected for all traits studied. The parental line NEB 319 seemed to be the best combiner for; number of seeds per pod, 100-seed weight and seed yield per plant. The parental lines F. 402 and introduced 131 were almost the best combiners for seed yield per plant and 100-seed weight, respectively.

Seven hybrids significantly surpassed their midparent values for seed yield per plant. The five hybrids, (NEB 319 × F. 402), (introduced 313 × NEB 319), (introduced 131 × F. 402), (introduced 131 × 61/1331/66) and (16/1311/166 × F. 402) outyielded the better parent. Significant positive correlation coefficients were obtained between mid-parent and F_1 hybrid means for, 100-seed weight and seed yield per plant. The two crosses (introduced 131 × F. 402) and (NEB 319 × F. 402) were of great importance in breeding programs whether towards hybrid field bean production or for traditional breeding procedure. The correlation between parental performance and their order of dominance revealed that few number of seeds/pod and high number of pods per plant behaved as dominant traits. No particular trend could be detected for the rest two traits.

Field bean (*Vicia faba*, L.) is an important legume crop in Egypt and increasing the yield of this crop is the ultimate goal of the plant breeder. Many investigations were carried out to estimate the genetic variance and its components for the improvement of field bean varieties (Bond, 1966 and 1967; El-Hosary, 1981 and 1985 and Mahmoud *et al.*, 1984). Meantime, attempts of genetic improvement have involved both development of F_1 hybrids, using male sterility and development of self fertile lines to change the breeding system to fall autogamy (Bond *et al.*, 1964 and 1966).