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GENETIC STUDIES OF SOME QUANTITATIVE CHARACTERS IN SOYBEAN (*GLYCINE MAX* (L.) MERRIL)

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ABSTRACT: Two crosses of soybean (Calland X Hardin) and (Elgin X Hardin), each with six populations (P1, P2, F1, F2, BC1 and BC2) were tested for earliness, yield and its components. Significant positive heterotic effects were detected for all traits except number of days to maturity which gave significant negative heterotic effect in both crosses. Overdominance towards the higher parent was obtained for number of branches per plant, first pod height and 100-seed weight in the first cross, number of pods per plant, number of seeds per plant and seed yield per plant in both crosses. Absence of dominance was detected for number of days to inflorescence in the second cross. Partial dominance, towards the higher parent was detected for other traits. Significant positive values of inbreeding depression (I. D.) were detected for number of branches per plant, plant height, number of seeds per plant, number of pods per plant and seed yield per plant in both crosses and first pod height and 100-seed weight in the second and first crosses, respectively. Insignificant I. D. value was obtained for number of days to inflorescence in the first cross. While, the other cases gave significant I. D. values. The additive gene effects were significant for all traits. Also, significant dominance values were obtained for all traits except number of branches in the first crosses. Significant estimates for one or more of the three types of epistasis in both crosses were detected for all traits. High heritability values in broad sense were obtained in both crosses for all traits except maturity period, number of seeds per pod, seed yield per plant in the second cross and 100-seed weight in the first cross which had a moderate heritability values. Moderate heritability values in narrow sense were obtained for most traits. The predicted genetic advance (expressed as a percentage of the mean) was rather moderate for all cases except maturity date and maturity period in both cross. Meanwhile, flowering date and 100-seed weight in the first cross showed low genetic gain.

Key words: soybean, six populations, heterosis, inbreeding depression and gene action

INTRODUCTION

Soybean (*Glycine max* L. Merril) is one of the most important leguminous crops all over the world. Soybean seeds are among the world's most important sources of oil and protein. The area cropped with soybean in Egypt has increased rapidly. In 1972, only 1100 ha were planted with the crop whereas in 1983 the figure was 62000 ha. During the