S U M M A R Y

The aim of the present study was conducted to determine the magnitude of heterosis and combining ability for yield and other yield contributing characters from a diallel cross involving six divergent genotypes ; two indigenous (Giza 25 and Giza 32) and four exotic (N.A. 413, N.A. 282, N.A.372, and N.A. 130) from U.S.A. The work was carried out at the Expermental farm of the Agricultural Research Center, at Giza, during 1983 and 1985 . Crossing among the genotypes by means of diallel system was done in 1983 and repeated in 1984 seasons. During 1985 , 36 treatments (30 F_1 hybrids , 6 parents) were sown in a randomized complete block with four replications . Data were recorded on random samples of five plants per plot.

Analysis of variance was performed on individual plant basis . Heterosis was computed as mean squares for each trait, as the percentage deviation of F_1 mean performance from its mid parent and better parent average values for individual crosses and the F_1 mean performance versus its mid parent and higher parent for all crosses . Estimates of general and specific combining ability were obtained following Griffing' (1956) method-1, model 1. A graphical analysis of Wr and Vr values was also made according to Jinks (1954).

The results can be summarized as follows :

(1) Genotypes significantly differed from each other in all the studied traits , local variety Giza 25 significantly surpassed all the tested parents in number of capsules per plant , seed yield per plant and oil percent . N.A. 282 gave the highest number of seeds per capsule and protein percent.

(2) F_1 means were significantly higher than parental means for all the studied traits except height of the first capsule .

(3) Heterosis mean squares for most traits was significant and more pronounced for plant height , fruiting zone length , number of capsules /plant , number of seeds/ capsule and seed yield per plant .

(4) Superiority of the F_1's over the mid-parent values ranged from 0.05 for 1000-seed weight to 26.04 for seed yield per plant . While, the range of superiority of the F_1's over better parent values was from -6.54 for 1000-seed weight to 19.71 for height of the first capsule .

(5) The mean squares associated with general and specific combining ability were significant for all traits .

High G.C.A. / S.C.A. ratios which largely exceed the unity were obtained for all traits , indicating that the large part of the total genetic variability associated with those traits was a result of additive and additive by additive types of gene action .

(6) The mean squares associated with reciprocal effect were highly significant for; days from sowing to maturity, plant height , number of fruiting branches per plant, 1000-seed weight and oil percent .

(7) N.A. 130 and N.A. 413 showed significant negative general combining ability effects for flowering and maturity dates . Also, N.A. 413 showed significant negative($\hat{g}_i$) effect for height of the first capsule and plant height. G. 25 , N.A. 372 and N.A. 130 showed significant positive general combining ability effect for number of capsules per plant . G. 25 , G. 32 and N.A. 372 appeared to be good combiners for number of capsules per plant . Local variety G.32 seemed to be the best combiner for 1000-seed weight . G. 25, and N.A. 372 proved to be the good combiner for seed yield per plant . G. 25, G. 32 and N.A. 130 had significant positive general combining ability effects for oil content. However, G.32 proved to be the best combiner for protein percent .

(8) The three combinations N.A. 282 x N.A. 372 , G.32 x N.A. 372 and G.32 x N.A. 130 appeared to be the most promising for breeding towards high yielding potentiality. Also, the three crosses (N.A. 413 x N.A. 372) ,(G.32 x N.A. 130) and (N.A. 282 x N.A. 372), two crosses (G.32 x N.A. 282) and (N.A. 413 x N.A. 130), the two crosses (G. 25 x N.A. 130) and (N.A. 413 x N.A.372), the cross (G.25 x G.32), the cross (G.25 x G.32), the two crosses (G. 25 x N.A. 372) and (N.A. 372 x N.A.130) would be promising for, oil percent, protein percent, earliness , short plant , lower position of the first capsule , large fruiting zone length, respectively .

(9) Studies of nature and degree of dominance revealed the existance of nearly complete dominance for number of capsules per plant and seed yield per plant, and partial dominance for the rest of the traits .

(10) The correlation between parental mean performances and their order of dominance revealed that increasing genes were dominated over decreasing ones for all traits except seed yield per plant and days from sowing to maturity . While, for the two exceptional cases , no particular trend could be detected . The parental line P_6 contained most of recessive genes , however, P_3 seemed to contain the largest number of dominant genes responsible for

earliness . Parental 4 seemed to carry the most dominant genes for the expression of seed index , fruiting zone length , number of seed per capsule , protein and oil content . However , parental 5 and P 6 had high concentration of recessive genes for the three first and the latter two traits , respectively . Also, the parental lines 6 and 1 carry most dominant genes responsoble for plant height , number of fruiting branches per plant, number of capsules per plant and seed yield per plant.