

**INHERITANCE OF SOME QUANTITATIVE
CHARACTERS IN COTTON CROSSES
(*Gossypium barbadense* L.) BY USING
TRIALLEL ANALYSIS**

By

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ABSTRACT

Trialallel or three-way mating design was carried out among three successive growing seasons (2015, 2016 and 2017) included 5 genotypes as parents belong to (*Gossypium barbadense* L.), 10 F₁'s and 30 three-way crosses. All these genotypes and crosses were evaluated in a randomized complete blocks design with three replications at Sakha Research Station – Kafr El Sheikh, Egypt. The results showed that, the mean squares due to genotypes were significant or highly significant for all studied traits. Also, the amount of useful heterosis values over better parent were significant and highly significant for both kind (3 parents and F₁ or P) for yield and yield components for the crosses (P₁ x P₃) x P₅ and (P₃ x P₄) x P₁, fiber traits for the cross (P₁ x P₂) x P₃, earliness traits for the cross (P₂ x P₃) x P₄ and for oilseed traits for the cross (P₂ x P₄) x P₁. The results of general combining ability (GCA) effects showed that, Giza 96 (P₅) was the best combiner for most studied yield components, fiber quality and earliness traits in both first and sccond kind. However, specific combining ability (SCA) for first kind (d_{ij}) showed that the cross cominations D₄₅ for most studied yield components and fiber traits, D₃₅ for most yield components and earliness traits and D₂₄ for oilseed traits had the best significant and highly significant values (useful) for thease traits. Furthermore, SCA for second kind (s_{ik}) showed that the cross combination S₂₄ for most studied yield components and earliness traits, cross combination S₄₁ for most studied yield components and oilseed traits and cross combination S₅₃ for most studied yield components and fiber traits had the best significant and highly significant values (useful) for thease traits. While, SCA for theired kind (t_{ijk}) showed significant and highly significant values (useful) of the crosses No. 7 for most studied yield components, fiber and earliness traits and cross No. 12 for most studied fiber, earliness and oilseed traits. The results showed that all studied traits were mainly controlled by additive x dominance epistatic variances and some of them were also controlled by additive variance in case of seed index (SI), mean maturity date (MMD) and oil content % (OC %) and additive x additive epistatic variances for the rest of them. Concerning heritability in broad sense, the values were ranged from 74.66 % for seed index (SI) to 98.77 % for gossypol content (GC %). While, the heritability in narrow sense ranged from 0.82 % for boll weight (BW) to 55.52 % for mean maturity date (MMD). Concerning correlation and path coefficient analysis, the results showed that the phenotypic correlations are generally lower than genotypic correlations because of masking effect of environment at phenotypic level. The results estimated for pathe coefficient analysis showed that number of boll /Plant (NB/P) and boll weight (BW) showed high positive direct effect and significant correlation on seed cotton yield /plant (SCY/P). NB/P followed by BW traits considered as the main and the most consistent sources effecting yield of cotton variation and consequently could be measured as essential characters in selection programs aiming to cotton yield improvement and the breeder may consider those traits as the main selection criteria.

Key words: Cotton (*Gossypium barbadense* L.), Heterosis, GCA, SCA, Epistasis, Heritability, Correlation, Path analysis, Diallel crosses, Three way crosses,

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