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EVALUATION OF SOME SELECTION PROCEDUERS UNDER DROUGHT STREES FOR IMPROVEMENT OF YIELD AND EARLINESS IN EGYPTIAN COTTON

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SUMMARY AND CONCLUSIONS

The present study was concluded in the Agronomy Department, Faculty of Agriculture, Kafr El-Sheikh University, Egypt. The investigation was carried out at Sakha Experimental Farm, Sakha Agricultural Research Station, Agricultural Research Center, Egypt, during 2014, 2015 and 2016 growing seasons. Gains from selection are very important in cotton breeding program, thus, the main objectives of the study were 1. improvement in economic characters, as seed cotton yield/plant, lint cotton yield/plant, number of bolls/plant, number of seeds/boll, seed index, lint percentage and fiber properties through application of selection criteria. 2. Screening all genotypes under water stress deficit to test for tolerance and chose the best genotypes to be used in breeding programs and discarded the low economic traits (sensitive genotypes). 3. Studies on some earliness characters with understanding association between earliness and yield productivity to get up a promising genotype and descriptive on wide scale for it later.

The materials used in study were population I (G.75 X Sea Island * G.89 X Pima S6) and population II (Uzbekistan * CB-58). The data showed an increase in mean performances for all characters with advanced generations from F_2 to F_4, indicating an accumulation of favorable alleles. The advanced generations, in F_3 and F_4, showed reductions in PCV and GCV, as compared with F_2 generation. Most characters showed high heritability values over 60 (%). Genotypic correlations, in most cases, were

higher than phenotypic ones in both F_3 and F_4 generations. The undesirable negative correlation, which existed between fiber length and strength with other yield contributed characters were broken up and converted to non-significant in F_4 generation.

The maximum predicted genetic advance for lint yield/plant, from F_3 and F_4 generations was achieved when selecting for three components, i.e. number of bolls/plant with number of seeds/boll and lint/seed, as well as for lint yield/plant, alone. Selection for lint yield/plant, alone, gave the maximum actual value in F_4 generation, followed by index involved lint yield/plant with number of bolls/plant. High discrepancy was observed between predicted and actual gains from selection for most procedures. Advance would decrease in F_4 generation, as compared with F_3 for all characters. Breeder could select some families, which are characterized by high yielding capacity with acceptable fiber properties and utilize such selected families in breeding program aiming to improvement of yield and quality in cotton.

Application of three managements; namely, W1 irrigation every sixteen days, as a control, W2 irrigation every twenty days and W3 irrigation every 32 days. The analysis of variance from randomized complete block design and a combined analysis, had shown the high significant genotypes for all studied traits in the two populations. Water stress (W) gave significant differences and genotypes x W interaction and were highly significant in the two populations. All genotypes were affected by water stress deficit and most traits were decreased, except the root length and

earliness index. The genotypes under study were tested to sensitivity by three indices; i.e., drought stress intensity (DI), geometric mean (G.M.) and susceptibility stress index (SSI). Irrigation water stress played the major role in most genotypes where, seed cotton yield/plant was decreased, except for some superior genotypes from both populations. Genotype behavior, under moisture stress conditions, came out as drought tolerant and revealed stability tolerance across environments and could be exploited in breeding program, aiming to improve water stress tolerance.