SUMMARY AND CONCLUSION

Cotton in Egypt ranked first in relation to fiber crops and efforts are exerted to increase cotton production and quality through agricultural policies and breeding new varieties.

It is well known that the productivity of any variety is the outcome of the interaction between the genetical constitution and environmental conditions. For this reason, cotton should be grown under suitable environmental conditions to achieve the highest yield and the best quality.

Therefore, 30 field experiments were conducted during the three successive seasons 1992 , 1993 and 1994 at ten different regions :-

- Upper Egypt (Sohag, Assuit, El-Minia and El-Faiyum).

- Southern and Middle Delta (Dakahlia, El-Gharbia and sharkeih.

- Northern Delta (Kafer El-Sheikh, El-Beheira and Damaitta), to evaluate 15 cotton genotypes of which twelve are the commercial varieties namely, dendera, Giza 45, Giza70, Giza 75, Giza76, Giza 77, Giza 80, Giza 81, Giza 83, Giza 84, Giza 85 and Giza 86, in addition to the three promising strains (Giza 75 x Rus. 6022), (Giza 77 x Giza 45A) and (Giza 77 x Giza 45B) .

Varieties and strains all together were grown following the routine adapted in the experimental stations. A complete randomized blocks design with four replications in each of the 30 environments (combination of ten locations in three years).

Variance components and different stability estimates over location and years were calculated for seed cotton yield and yield components, in addition to fiber property traits.

The results obtained could be summarized as follows :-

I . <u>Effect of cotton genotypes, locations, years and the interactions between them :-</u>

I .1. <u>Effect of cotton variety</u> :-

I . 1. A . Varietal effect on the yield and yield components :-

Results obtained revealed that yield and yield component characters were highly significantly affected by cotton variety.

1- Mean seed and lint cotton yields showed that Giza 85 and the promising strain Giza 75 x Rus. 6022 had the highest values, while Giza 45 gave the lowest yields.

2- Regarding boll weight and seed index, Giza 75 and Giza 85 gave the highest values for these traits, while Giza 80 and Giza 83 had the highest values for lint percentage and lint index. On the other hand, Giza 45 and the promising strain Giza 77 x Giza 45A had the lowest values for lint percentage and lint index.

I. 1. B . Varietal effect on the fiber properties :-

The results demonstrated that all the studied fiber properties were significantly affected by variety .

Mean values of the micronaire reading were lowest for Giza 45 and Giza 77 x Giza 45A.

As for fiber strength and fiber length, it was clear that Giza 70, Giza 45 and Giza 77 x Giza 45B had the highest values.

I. 2 . <u>Effect of the years</u> :-

I. 2 : A Seasonal effect on the yield and yield components :-

Results revealed that the climatic conditions during the second year (1993) affected favorably all characters under study in comparison with the other two years of 1992 and 1993. The differences among the three years were significant for all characters, except number of bolls per plant and lint percentage .

I. 2. B. Seasonal effect on the fiber properties :-

Results revealed that the climatic conditions during the second year (1993) were more favourable than those in the other two years (1992 and 1994) in

affecting the two characters micronaire reading and 50 % span length only. The differences were significant among the three years in all characters, except fiber strength trait.

I.3. Effect of the location :-

I . 3 . A . location effect on the yield and yield components :-

The ten locations differed significantly concerning seed cotton yield, lint yield and lint percentage. El-Faiyum governorate favourably affected seed cotton yield, lint yield, boll weight, number of bolls per plant and seed index as compared with the other locations. While, El-Beheira was better than El-Faiyum for lint index trait. El-Dakahlia governorate favourably affected lint percentage. On the other hand, El-Minia and Assuit governorates were lower than other locations tested in all characters studied.

I . 3 . B . location effect on the fiber properties :-

The ten location differed significantly concerning fiber properties, except the micronaire reading. El-Faiyum and Sohag governorates favourably affected fiber strength and fiber length (2.5 % and 50 % span length) and recorded the highest values as compared with the other locations, while the lowest values were observed in El-Minia and Sharkeih locations.

I. 4 . Effect of the interaction between cotton varieties and years :-

Significant interaction effects were detected for seed and lint cotton yields, number of bolls per plant, lint percentage, lint index, seed index and all fiber property traits under study.

These results give evidence that the varieties differed in their responses to the environmental conditions from one year to another.

This means that the superiority of a certain variety depends on the conditions prevailing during the growing season.

I . 5 . Effect of the interaction between cotton varieties and locations :-

Significant effects for genotype x location were found except, with boll weight and lint index which were not significantly affected with this interaction.

1. From the results of seed and lint cotton yields, it is apparent that for producing the highest seed and lint cotton yields, it is recommendable to grow Giza 80 variety at Upper Egypt (Sohag and Assuit), Giza 85 and Giza 83 at Middle Egypt (El-Minia and El-Faiyum), the promising strain Giza 75 x Rus. 6022 at South and Middle Delta (El-Gharbia and El-Sharkeih) and to grow Giza 83, Giza 86 and Giza 75 x Rus. 6022 genotypes to get the highest yield at North Delta (Dakahlia, Damiatta, El-Beheira and Kafer El-Sheikh).

2. High mean seed cotton yield and yield components exhibited by the long staple genotypes are due to their genetic constitution in addition to their high adaptability for wide environmental conditions at several locations and it could be recommended that they are to be included in the breeding programs aiming to improve yield and its components. On the other hand, the extra-long staple genotypes were less adapted for wide environmental conditions thus, these genotypes have to be grown in the North Delta regions as the environment conditions are more suitable for producing the best fiber properties, because Extra-long staple genotypes produce higher fiber strength and longest fiber length than the long-staple ones, mainly due to genetic differences between them.

I . 6 . Effect of the interaction between locations and years :-

This interaction had highly significant effect on all yield and its components and fiber properties traits under study.

From the results of the interaction between location and years, it could be seen that the different traits changed in these means from location to another and from year to another, but generally it can be seen that Sohag in 1992 was the

best environment for fiber properties, while El-Faiyum at the same year gave the best yield.

I . 7 . Effect of the interaction between cotton varieties, locations and years:-

This second order interaction affected significantly all traits of yield and its components. The effect was highly significant for all fiber property traits except, fiber length (2.5 % and 50 % span length), which were insignificantly affected.

The results show the important role of each of (genotypes, locations, years, locations x years interaction, as well as genotypes x environment interaction) that affect seed cotton yield and yield components and also fiber property traits..

Therefore, it seems necessary to continue evaluating cotton genotypes, old or newly produced, by growing them at several locations over an adequate number of years before recommending any variety for a certain location.

II . Variance components and heritability :-

1 . High heritability values were reached for seed cotton and lint cotton yields, being 89.55 % and 94.05 %, respectively.

2 . High heritability values of 95.71 %, 85.58 %, 99.22 %, 99.o6 % and 93.92 % were also reached for boll weight, number of bolls per plant, lint percentage, lint index and seed index traits, respectively.

3 . There was an essential amount of genetic variance for each trait hence, the broad sense heritabilty estimates were high for all traits. Genetic coefficient of variability ranged from 4.37 % for seed index to 17.28 % for lint yield, these values indicated the environmental effects on all traits studied.

4 . The high heritability values for fiber properties were 97.89 %, 97.82 %, 99.26 % and 97.84 % for micronaire reading, fiber strength, 2.5 % span length and 50 % span length, respectively.

5 . Genetic coefficient of variability ranged from 5.24 % (for 50 % span length) to 8.92 % (for micronaire reading). These values indicated that environment effects on all traits studied were considerable.

III . Genotypic stability for different genotypes :-

1. Adaptability estimates indicated that Giza 45, Giza 76, Giza 70, Giza 77 and Giza 77 x Giza 45A which yielded below average mean yield over environments are poorly adapted to all environments. However, the genotypes Giza 75 x Rus. 6022, Giza 85, Giza 83, Giza 86, Giza 75, Giza 84 and Giza 80 which were above average mean yielding ability had general adaptability or well adapted to all environments. The remaining genotypes (Dendera, Giza 81 and the promising strain Giza 77 x Giza 45B) which were not significantly different from the average mean performance of all cultivars had average stability.

2 - The several stability estimates used, indicated that for selection for stability with the objective of incorporating this important trait in the Egyptian cotton germplasm, the following genotypes may be considered as breeding stocks for specific traits :-

Seed cotton yield	Giza 75 x Rus. 6022.
Lint cotton yield	Giza 84.
Boll weight and seed index	Giza 80 and Giza 86.
Number of opening bolls per plant	Giza 86.
Lint percentage	Giza 86 , Giza 81 , Giza 77. and Giza 77 x Giza 45B.
Lint index	Giza 86 and Giza 85.

3- Only extra-long staple met the performance response and stability characteristics of ideal genotypes for all fiber property measurements. Therefore, the extra-long staple genotypes may be used as a breeding stock for incorporating in any

crosses with the objective for selection for stable fiber properties (micronaire reading, fiber strength and fiber length).