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A STUDY ON FIBER MATURITY IN COTTON AND ITS RELATION TO LINT AND YARN PROPERTIES

By

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B.Sc. Agric., Cairo Univ., 1981

A thesis submitted in partial fulfillment of
the requirements for the degree of

MASTER OF SCIENCE
In
Agriculture
(Agronomy)

Department of Agronomy
Faculty of Agriculture
Ain Shams University

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ABSTRACT

Rokaya Mahmoud Hassan Mohamed. A study on fiber maturity in cotton and its relation to lint and yarn properties Unpublished Master of Agriculture Science, thesis, Ain Shams University, Faculty of Agriculture, Agronomy Department, 1997.

The present study was carried out to investigate: (1) the effect of cultivars, locations. seasons and their interactions on cotton fiber maturity and other fiber and yarn properties, (2) the relationship of fiber maturity to other fiber and yarn properties, and (3) the relative contribution of fiber maturity and other main fiber characters to yarn strength, appearance and evenness. Samples from 12 Egyptian cotton cultivars representing the extra-long staple (ELS) and long staple (LS) categories were taken from the miniature experiments conducted by the Regional Evaluation of Cotton Cultivars Research Department, Cotton Research Institute at ten governorates (locations) in Delta, Central and Upper Egypt in 1992 and 1993 seasons.

"Standard method" for estimating fiber maturity was performed as degree of thickening percent (DTP) by swelling fibers with (Na OH 18%) on different group lengths of samples sorted with the Suter-webb device. Data showed that within the ELS cvs., Giza 45 gave the lowest maturity percent, while Giza 76 gave the highest. Within the LS cvs., Dandera exhibited the lowest maturity, while Giza 75 and Giza 81 exhibited the highest. With regard to locations, Domietta gave the better ELS mature fibers, while El-Sharkieh gave the lowest values. Within LS cvs., El-Dakahlia exhibited the highest maturity, whereas Domietta showed the lowest.

Among the three methods used to estimate fiber maturity, viz., (DTP), Lord (1961) and Shirley F/MT instrument, the F/MT seemed to be preferable by the cotton breeder to be used in routine work, since its measurements were close to the standard method (DTP) and it is rapid and accurate as compared to the (DTP) and Lord (1961) method which are tedious and time consuming.

Positive and significant correlations were found between (DTP) and each of micronaire values, ribbon width and fineness by weight. On the other hand, (DTP) showed negative and significant "r" values with each of fiber length at 2.5% and 50% S.L., fiber strength, Lea and single strand strengths, yarn evenness and nep count, only the latter value was insignificant.

Path-analysis indicated that the total direct contribution of fiber maturity, fiber fineness, fiber length and fiber strength and their joint effects amounted to 88.4%, 85.9% and 84.6% in the total variation of single strand strength, yarn appearance and yarn unevenness, respectively and that fiber maturity coupled with fiber fineness showed their apparent effect on yarn unevenness (39.76%).

Key words :

Cotton , Cultivars, Locations, Fiber properties, Maturity, Fineness, Length, Strength, Yarn strength, Appearance, Unevenness.

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