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Are Cotton Fiber Characters Under Influence of Planting Dates?

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ABSTRACT
During 2000-2001, an experiment was conducted at Cotton Section, Agriculture Research Institute, Tandojam to study whether there is any influence of planting dates on fiber characters of three cotton genotypes CIM-109, Karishma and CIM-240. Results demonstrated that when the planting date was delayed, staple length, uniformity ratio, fibre maturity and fibre strength were significantly reduced. Fibre fineness and fibre elongation were not significantly affected by planting date. Differences among the cultivars were significant for all the characters studied except fibre strength. However, interactions between cultivars × planting date were non-significant for all the fibre characters studied.

KEYWORDS: Cotton (*Gossypium hirsutum*), planting dates, fiber characteristics

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INTRODUCTION

Cotton is very sensitive plant and responsive to the changes in environments. Research work carried out in the world has established that when cotton is sown in its favourable/optimum environment, its response is positive. When there is slight deviation, for example, when sown early and late than its optimum sowing time, then its growth and other characters are also affected according to prevailing environments. It has been documented that fiber characters of different genotypes also accept the influence of changing environments. It was therefore felt appropriate to conduct the studies on the aspect that whether planting dates could influence the fiber characters of three commercial cotton varieties under Multan conditions when sown under different planting regimes.

Arshad *et al.* (2001) studied the effect of planting dates on fiber characters and suggested that when the planting date was delayed, staple length, micronaire value, fiber maturity and fiber strength were significantly reduced. Varietal differences were highly significant for all the characters studied, whereas, years had non significant effects, interaction between varieties and years was also non significant. Year x planting date, varieties x planting date and year x variety x planting date were highly significant for staple length and non significant for rest of the characters studied. El-Zik *et al.* (2000) were of the view that planting date and genotype had significant effect on fiber quality traits.

Galenopoula *et al* (1980) observed inferior micronaire value from the crop which was late planted. Constable *et al* (1976) demonstrated that reduction in low temperature due to late planting caused staple length, strength and fineness to decline. Ibrahim *et al* (1973) suggested that higher values for staple length were obtained when crop was sown during early part of the season. Bilbro and Ray (1973) also observed that fiber length and micronaire units were reduced due to late planting and fibre strength was increased while fibre elongation was not significantly affected. Culp and Harrell (1972) opined that planting dates caused very little variation in fiber quality, while micronaire was slightly reduced due to late planting, whereas, Bridge *et al* (1971) reported that there was no stable effect of planting dates on fiber properties in hirsutum cottons.

MATERIALS AND METHODS

Planting date experiment was laid out at Cotton Section, Agriculture Research Institute, Tandojam during 2000-2001. The planting dates were 1st May, 15th May, 1st June, 15th June and 1$^{st.}$ July. Three commercial cotton varieties included were CIM-109, Karishma and CIM-240. The experiment was laid out in split plot design with three replications. Distance between rows was 75 cm while between plants it was 30cm in main plots, whereas, varieties were kept in sub plots. All usual agronomic and cultural practices including plant protection measures were undertaken according to the schedule.

One kg composite samples of seed cotton were collected from each plot at the time of picking and ginning was done on small saw ginning machines to get the lint for following fibre tests.

Staple Length

The staple length was measured through fibrograph model 330.

Uniformity Ratio
It was worked out from an estimate of upper half-mean length and mean length following the formula;
U.R. %=50% S.L. /2.5 S.L. × 100

Fibre Fineness
Determined on Fineness meter

Maturity Ratio
Determined on fineness maturity tester

Fibre Strength
Strength was determined on pressely strength tester as Fibre strength= Breaking loads in lbs × 10.81/Sample weight in milligram.

Fiber Elongation
Determined on stelometer

The data thus collected were statistically analysed by analysis of variance technique and LSD was applied to compare the means.

RESULTS AND DISCUSSION

Staple Length
Mean performance data regarding staple length under different dates are presented in Table-1. The results showed that planting date significantly affected the staple length. On the basis of average of all the varieties the staple length was 27.2 mm and 27.7 mm in 1st May and 15th May planting respectively (Table-1), then it started declining gradually with delay in planting. Arshad *et al.* (2001) reported that year x planting date, varieties x planting date and year x variety x planting date were highly significant for staple length, El-Zik *et al.* (2000) also observed that planting date and genotype had significant effect on fiber quality traits. Bilbro and Ray (1973), Ibrahim *et al.* (1973) and Constable *et al*. (1976) also supported our observations. On the basis of average of all the planting dates, CIM-109 gave 27.58 mm staple length followed by CIM-240 (26.81mm) and Karishma (26.11mm). The differences were highly significant. However, the interaction between varieties × planting date was non-significant (Table-2).

Uniformity Ratio
The data presented in Table-2 indicated a little declining trend with the delay in planting time, being highest in 1st May planting and lowest in 1st July planting. On the basis of average of all the varieties, uniformity ratio was 48.6 % in 1st May planting, and then it slightly declined as the planting date was delayed and was minimum (47.2 %) in 1st July planting. The statistical analysis showed that the differences among the planting dates were significant, whereas, the differences due to varieties were highly significant, but the interaction between varieties × planting date was non-significant (Table-2).

Micronaire Value
The data depicted in Table-2 revealed that the difference due to planting date with respect to micronaire was non-significant. On the basis of average, early planting of 1st May gave the highest value (4.4) for this character and then gradually decreased with delay in planting date. 1st July planting gave the minimum micronaire value of 4.1 (Table-1). These findings are in accordance with those of Culp and Harrell (1972). On the basis of all the planting dates, variety CIM-240 gave the highest micronaire value (4.63) followed by Karishma (4.26). The variety CIM-109 had the lowest micronaire value (3.93). The varietal differences were significant, but the interaction between variety × planting dates was non-significant.

Maturity Ratio
The data presented in Table-1 showed that fibre maturity ratio was higher in early planting date and gradually decreased with delay in planting date. On the basis of average of all the varieties 1st May planting produced the highest mature fibres with 0.91 maturity ratio value. The minimum value of fibre maturity (0.84) was obtained from the 1st July sowing. The statistically analysis (Table-2) showed that the differences among the planting dates was highly significant, while the difference among the varieties was significant. However, the interaction of varieties × planting date was non-significant.

Fibre Strength

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The data presented in Table-1 revealed that the fibre strength was the highest in all the varieties in 1st June planting. It decreased with each planting date and was lowest in last planting done on 1st July. On the average of all the varieties, the fibre strength was highest (95.3 thousand pounds per square inch) in 1st June planting and the lowest (90.43 tppsi) in 1st July planting. The differences among the planting dates were significant (Table-2). These results are in conformity with those of Constable *et al* 1976. However, Bridge *et al* (1971) contradicted the present results by reporting that planting dates showed no effect on fiber strength.

Fibre Elongation

The statistically analysis (Table-2) indicated that planting date did not affect the fibre elongation as the differences due to planting dates were non-significant, varietal effect was highly significant, whereas, interaction between varieties × planting dates was non-significant. However, 1st June planting gave a little higher fibre elongation than early or late planting (Table-1). Bilbro and Ray (1973) also reported the non-significant effect of planting dates.

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Table-1: Mean performance of varieties under different planting dates

Character	Planting Dates					Varieties		
	D1	D2	D3	D4	D5	V1	V2	V3
Staple length	27.2 [a]	27.7 [a]	26.9 [b]	26.3 [c]	26.3 [c]	27.6 [a]	26.1 [c]	26.9 [b]
Uniformity ratio	48.6 [a]	47.3 [b]	47.4 [b]	47.7 [ab]	47.2 [b]	48.4 [a]	47.3 [b]	47.2 [b]
Micronaire value	4.3 [b]	4.3 [a]	4.2 [b]	4.2 [b]	4.1 [c]	4.0 [c]	4.2 [b]	4.5 [a]
Maturity Ratio	0.91 [a]	0.89 [ab]	0.89 [ab]	0.85 [bc]	0.84 [c]	0.85 [b]	0.87 [a]	0.89 [a]
Fibre strength	95.3 [a]	93.1 [ab]	91.8 [bc]	91.7 [bc]	90.4 [c]	93.2 [a]	92.7 [b]	91.5 [c]
Fibre elongation	5.1**c**	5.4 [a]	5.5 [a]	5.2 [b]	5.0 [bc]	5.0 [b]	5.7 [a]	4.9 [c]

Means followed by the same letter are not significantly different at the 5% level

Table-2: Significance level for varieties and planting dates

Characters	Mean Squares					
	Planting date		Varieties		Interaction	
	0.01 %	0.05 %	0.01 %	0.05 %	0.01 %	0.05 %
Staple Length	0.55*	0.79*	0.41*	0.56**	N.S	N.S
Uniformity Ratio	0.95*	0.99*	0.71**	0.96**	N.S	N.S
Micronaire Value	N.S	N.S	0.12*	0.17*	N.S	N.S
Maturity Ratio	0.04	0.05**	0.03*	0.04*	N.S	N.S
Fibre Strength	2.34*	2.52*	N.S	N.S	N.S	N.S
Fibre Elongation	N.S	N.S	0.28*	0.38**	N.S	N.S

N.S=Non significant * Significant (P< 0.01) ** Highly significant (P< 0.05)

REFERENCES

Arshad, M., N. Illahi, M. Afzal, R. Ali and M. Hanif, 2001. Effect of planting dates on fiber characters of three upland cotton varieties. Pak. J. Biol. Sci., Vol.4 (Suppl. Issue No.4): 313-315.

Bilbro, T.D. and L.L. Ray, 1973. Effect of planting date on the yield and fibre properties of three cotton cultivars. Agron. J. 65(4): 606-609.

Bridge, R.R., W.R. Meredith, Jr. and T.F. Chism, 1971. The influence of planting date on agronomic and fibre properties of cotton. Crop Sci. 12: 353-358.

Constable, G.A., N.Y. Harris and R.E. Paull,1976. The effect of planting on the yield and some fibre properties of cotton in the Namoi Valley. Aust. J. Expt. Agri. and Animal Husbandry. 16: 265.

Culp, T.W. and D.C. Harrell, 1972. Variation in fibre and yarn properties of identical checks in yield test and nursery plots of upland cotton*, Gossypium hirsutum* L. Crop Sci. 12: 355-358.

El-Zik, K. M., P. M. Taxton, T. F. Dusek and T. D. Brooks, 2000. Effect of planting date, moisture and heat units on cotton yield and fiber quality under dry conditions. Procd. Beltwide Cotton Conf. Vol.1: 525-527.

Galanopoulo-Sendouka, S., A.G. Saficas, N.A. Fotiadis, A.A. Gagianas and P.A. Gerakis, 1980. Effect of population density, planting date and genotype on plant growth and development of cotton. Agron. J. 72: 347-357.

Ibrahim, M., M.A. Khan and G. Sarwar, 1973. Genotype Environment interaction studies in *G. hirsutum* L. under Lyallpur conditions. The Pakistan Cottons, 17(4): 134-141.

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