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Association Analysis for Seed Cotton Yield and Fiber Quality Improvement in Intra Specific Crosses of Cotton (*Gossypim hirsutum* L.)

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ABSTRACT

Correlation studies in 45 intraspecific hybrids revealed that seed cotton yield significant positive association with micronaire and inter-correlation between different fibre quality traits suggested that these characters can be improved simultaneously and these were contributing for improving yield as well quality traits in cotton.

Key words*; Cotton, Seed Cotton Yield, Fibre Quality, Intra-Specific Cross*

INTRODUCTION

Cotton is one of most important commercial crop supply lint as a raw material to the textile industry and generates employment opportunity for billions of people. At a global level, India ranks first in area and second in production next to china. Cotton hybrids occupy about 45 percent of the total area and contribute about 55 percent to the total production[2]. This is not sufficient to meet the requirement of increasing population. Last few decades ago there is increasing demand for fiber quality at international markets. In order to develop promising genotypes with enhanced yield and quality traits, understanding of the relationship between the different traits is most important. This can be used as one of the criteria for formulating a selection programme. Thus present research was undertaken out to get the information on correlations for seed cotton yield and fiber quality traits for utilization in the improvement of the crop in early generations.

MATERIALS AND METHODS

The Material consists of 45 intra *hirsutum* hybrids obtained by crossing 10 distant parental genotypes in a half diallel design. The evaluation is carried out in a randomized complete block design (RCBD) with a three replication at ARS, Siruguppa during 2013-14 accompanied by a spacing of 60 cm within and 90 cm between the rows with a length of 6 meters. All recommended cultural and need-based plant protection measures were taken up to establish the good crop. Observations were taken on the middle five competitive plants and Seed cotton sample of about 300g was collected from each treatment in every replication and these were ginned to 100g lint weight.

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Fiber quality properties viz, 2.5% Span length (mm), Fibre strength (g tex -1), Fibre elongation (%), Fibre strength to length ratio were quantified by using High Volume Instrument (HVI) at Central Institute for Research on Cotton Technology (CIRCOT), Main Station at Mumbai (India). On the mean basis, the character association was carried out in accordance with suggested by Fisher *et al.*[5].

RESULTS AND DISCUSSION

Table 1: Descriptive statistics for fibre quality in 11 F_1 cotton generation

Characters	Range	Mean	Std. deviation	Coefficient of variation (%)
SCY (Kg/ha)	629.63-2528.25	1620.64	425.88	26.27
2.5% SL	25.8-31.59	29.11	1.19	4.10
UR%	48.5-54.5	52.20	1.22	2.33
MIC.	3.25-5.1	3.80	0.35	9.14
FIB STR.	20.05-23.85	21.77	0.96	4.40
ELONG.	4.3-6.1	5.48	0.36	6.58
S/L RATIO	0.68-0.83	0.75	0.04	4.77

SCY-seed cotton yield (kg/ha), 2.5% SL – 2.5% span length, UR%- uniformity ratio, MIC-micronaire, FIB STR-fibre strength, ELONG- elongation percentage, S/L RATIO- strength to length ratio.

Successful plant breeding program mainly depends on the genetic variability for a particular character. Estimates of range, mean, standard deviation and coefficient of variation (CV) for selected F_1 generation evaluated are shown in Table 1. The maximum standard deviation was observed on seed cotton yield (425.88) followed by uniformity ratio (1.22) and 2.5% span length (1.19). Among the fiber quality traits measured micronaire, elongation percentage, strength to length ratio, fibre strength and 2.5% span length with the CVs of 9.14, 6.58, 4.77, 4.40 and 4.10 percent had more phenotypic variation, respectively. Fiber uniformity ratio 2.33 had less variation. This study reveals that breeder have maximum possibility of effective selection for improvement of fiber quality in subsequent segregating populations for these genotypes.

Table 2: correlation coefficients between seed cotton yield with fibre quality traits

Character	2.5% SL	UR%	MIC.	FIB STR.	ELONG.	S/L RATIO	SCY
2.5% SL	1						
UR%	-0.30**	1					
MIC.	-0.18**	0.024**	1				
FIB STR.	0.38**	0.10*	-0.33**	1			
ELONG.	0.15*	-0.210**	-0.003*	0.22**	1		
S/L RATIO	-0.51**	0.37**	-0.15**	0.58**	0.08*	1	
SCY	-0.05*	-0.058*	0.19**	-0.17**	-0.05*	-0.11*	1

* Significant at 5% level, ** Significant at 1% level, SCY-seed cotton yield (kg/ha), 2.5% SL – 2.5% span length, UR%- uniformity ratio, MIC-micronaire, FIB STR-fibre strength, ELONG- elongation percentage, S/L RATIO- strength to length ratio.

The correlation co-efficients furnish authentic measures of association between the traits and assist to differentiate crucial associates useful in breeding from those of the non vital ones[4]. The correlation co-efficient between seed cotton yield and fibre quality traits for hybrids calculated were presented in Table 2.

In the present study, seed cotton yield was significant and negatively correlated with all fibre quality traits excluding with miconaire

value (0.19). Similar results for positive correlation between yield and fibre quality related traits were already reported by Kalpande *et al.*[6], and Reddy and Reddy[7]. Hence, selection for these characters will help in selecting genotypes with high seed cotton yield with appropriable micronaire value.

Inter-correlation among fibre quality traits exhibited positive significance among themselves with some of other such as 2.5% span length with fibre strength (0.38) and elongation percent (0.15), uniformity ratio with length to strength ratio (0.37) followed by fibre strength (0.10) and micronaire (0.024), fibre strength with elongation percent and strength to length ratio while elongation percent with the strength to length ratio respectively. This is in accordance with the previous findings of Dutt *et al.*[3], and Basbag and Gencer[1]. Hence the selection of positive combination character will results in simultaneously improvement of both the traits.

CONCLUSION

The conclusion of correlation analysis revealed that simultaneous selection based on seed cotton yield, 2.5 per cent span length, fibre strength and elongation percentage, uniformity ratio, strength to length ratio and micronaire value may be promising under intra-specific hybridization and needs to be post pone the selection for further/advanced generations.

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