

Genetic Variability and Heritability Analysis for Yield and Fibre Quality Traits in Cotton Genotypes

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ABSTRACT

An experiment to find out the genetic variability and heritability estimates for yield fibre quality attributes in different cotton genotypes was carried out at the research area of Department of Plant Breeding and Genetic, Faculty of Agriculture, Gomal University Dera Ismail Khan, during the cotton crop season 2023-2024. The experiment was carried out in randomized complete block design with three replications. Plot size was $3 \times 3 \text{ m}^2$ with space of 0.30m within hills, and the seeds were sown at rate of 5 seeds/hill. The matured open bolls were picked comprised of two pickings, in the months of October and November. Data was recorded for various yield and connected characteristics as well as fibre quality attributes viz., plant height, number of bolls plant⁻¹, boll weight, plant population, seed cotton yield, ginning out turn, staple length, staple strength, micronaire value and uniformity index. The results depicted that various yield components like plant

height, number of bolls plant⁻¹, boll weight as well as seed cotton yield were non-significantly different in different cotton cultivars however the plant population significantly differed in these cotton cultivars. Similarly ginning out turn was also non-significant, however these cultivars exhibited higher significant differences for all the fibre quality attributes like staple length, staple strength, micronaire value and uniformity index. It was observed that CIM-622 and CEMB-66 depicted the maximum staple length, strength, micronaire and uniformity index and were found to be the top promising cultivars regarding the fibre quality attributes. These cultivars although produced non-significantly different seed cotton yield, yet produced considerable amount of seed cotton yield as compared to the other cultivars. Similarly, the cultivar CIM-616, VH-Gulzar, CRIS-600 and FH-142 ranked second, also performed much better and depicted considerable fibre quality attributes like staple length, strength, micronaire and uniformity index. Based on these results, CIM-622, CEMB-66, CIM-616, VH-Gulzar, CRIS-600 and FH-142 were found to have considerable seed cotton yield and excellent fibre quality attributes and are recommended for general cultivation under the agro-ecological conditions of the Dera Ismail khan region.

Key words: *Gossypium hirsutum* L, Fibre Quality, Micronaire, Yield

Introduction

Cotton (*Gossypium hirsutum* L.) plays a crucial role as the main crop for fibre and being the second-largest oil producer worldwide. It has a major impact on Pakistan's agricultural landscape, contributing 4.1% to value added and 0.8% to the GDP (Rehman et al., 2025). Recognized as "Heart oil," cotton seeds oil is devoid of cholesterol. In the context of edible oil, cotton contributes to 60-70% of total production in Pakistan and holds a 4% share in the global vegetable oil production (Gudeta et al., 2023). Approximately 26% of Pakistani farmers cultivate cotton across 1937 thousand hectares, yielding a production of 8.3 million bales. This cultivation serves as a crucial source of supplies for Pakistan's major agro-industrial sector, the textile industry. 17% of the workforce is employed in the textile sector, which also provides 60% of the nation's foreign exchange, 0.6% of the GDP, and 2.4% of the value added in agriculture (Mehran et al., 2023).

The elongated epidermal cell of the seed, known as cotton fibre, serves as the primary product of the cotton plant. After the ginning process, this fibre is spun into yarn, while the seed fuzz finds application in cellulose production. Additionally, cotton seeds

play a crucial role, as they are crushed to extract high-quality oil suitable for human consumption, often used in cooking. The by-product, cotton seed cake, rich in proteins, serves as feed for dairy animals. Fresh cotton sticks are grazed by animals, while in their dry form, they are burned for cooking purposes, particularly in mud-based stoves in the Punjab and Sindh provinces where natural gas is unavailable (Nazir et al., 2020).

On the other hand, premium fibre is essential to the textile sector since it has a direct impact on productivity, marketability, processing effectiveness, and yarn quality. Plant breeders and geneticists have been forced to create colored cotton that is both Bt and non-Bt due to advancements in spinning and weaving technologies as well as the introduction of the Bt gene in cotton genotypes with superior fibre quality (Nazir et al., 2020). Cotton, enriched with the Bt gene, presents an appealing option for the textile industry to alleviate the adverse impacts of fabric dyeing processes. Varieties of colored cotton that come in green, blue, brown, and white hues are useful because of their adaptability. Still, the poor quality of their fibre has made it difficult for naturally colored cotton to be widely used in the production of textile products. It has been noted that the amount of cellulose and its biosynthesis have a major impact on the fibre quality of green, brown, and white cotton (Malik et al., (2018).

For a given cotton genotype, the combination of various characteristics fineness, strength, uniformity, and staple length, for example achieves the best possible fibre quality. These quality traits globally establish the basis for the marketing and trade of cotton. BT cotton is used to control bollworm, a significant insect pest that harms cotton harvests. Positive changes have resulted from the growing of BT cotton, including a decrease in pesticide use and an increase in output. The degree to which insecticidal genes are expressed determines how effective BT cotton is. However, different cotton kinds, plant ages and parts, gene types, and environmental conditions all affect how well these genes work to control target insect pests. It is important to remember that the continuous creation of minuscule amounts of BT toxin in cotton has the potential to cause insect resistance, which would undermine the benefits of BT cotton (Zia et al., 2018).

The broad sense heritability and expected genetic advance estimation are very helpful for the plant breeders particularly in the phenotypic selection in early generations for different parameters which results in remarkable outcome of selection (Vineela et al., 2013). They are considered as the preponderance of the additive gene action controlling

these attributes which have more broad sense heritability and genetic advance (Reddy and Reddy, 2016). Seed cotton yield and fibre quality depend on bolls plant⁻¹, boll weight, ginning out-turn and their relationship with yield has extreme prominence (Latif et al., 2015). Active cultivar selection has expressively been underscored for conservation of genetic resources along with reliable variability of desired features (Ahmad et al, 2015). Keeping in view the significance of the genetic variability, heritability and genetic advance, the present investigation was performed with the following objectives.

1. To study the genetic potential of 15 BT cultivars for various morphological traits and seed cotton yield under Dera Ismail Khan climatic condition.
2. To study the genetic potential of 15 BT cultivars for various fibre quality traits under Dera Ismail Khan climatic condition.

Materials And Methods

The trial was conducted for assessment of genetic variability, genotypic and phenotypic variances, heritability estimates and genetic advance among fifteen upland cotton cultivars. The cultivars (CIM-616, CIM-622, CRIS-600, CRIS-641, IR-NIBGE-7, VH-Gulzar, Neelam-131, Sitara-008, CEMB-33, FH-142, BH-184, Auriga-216, Thakkar-80, IUB-13 and CEMB-66) varying in pedigree, year of release and morphological attributes were collected from Central Cotton Research Institute, Multan. These cultivars were planted at research site of Department of Plant Breeding and Genetics, Faculty of Agriculture, Gomal University, D.I.Khan during the cotton crop season 2023.

Seedbed was prepared and applied with phosphoric fertilizer (P₂O₅) in the form of single super phosphate (18%) @ 60 kg ha⁻¹. The ridges were made with space of 0.75m between ridges. The seeds of all cultivars were delinted through sulphuric acid treatment. The delinted seed of all cultivars were planted according to triplicate Randomized Complete Block design. Plot size was 3 × 3 m² with space of 0.30m within hills, and the seeds were sown at rate of 5 seeds/hill. Field was directly watered after sowing, and 50 kg per hectare N in the form of urea fertilizer was smeared. After three weeks thinning was performed and one plant was left to ensure recommended plant population. The rest of nitrogenous fertilizer was applied in split doses at the rate of 50 kg ha⁻¹ N in urea form at flower formation and boll formation stages. All cultural operations were performed as per commendations.

The matured open bolls were picked comprised of 2 pickings, in the months of October and November. The picked seed cotton was kept separate in bags and stored under fumigated conditions.

Data Recording

Data was recorded for various yield and connected characteristics as well as fibre quality attributes as below:

a) Agronomic Traits

1. Plant height (cm):

The height of 5 matured plants was restrained by measuring tape from base to main stem tip.

2. Bolls Plant⁻¹:

Mature bolls from five selected plants were totalled and their average was calculated.

3. Boll weight (g):

From each genotype about hundred bolls were randomly picked at maturity and weighed through electric balance in grams (g), then their average boll weight was estimated.

4. Plant Population:

Number of plants was counted from each genotype and plant population was estimated by means of the following formula:

$$\text{Plant Population ha}^{-1} = \frac{\text{Number of Plants plot}^{-1} \times \text{Size of ha}}{\text{Size of plot}}$$

5. Seed cotton yield (Kg Hec⁻¹):

A total of all picks from each genotype at regular interval were taken and weighed through electric balance in kilograms (kg), and then seed cotton yield hectare⁻¹ was determined by formulation:

$$\text{Seed cotton yield (Kg Hec}^{-1}) = \frac{\text{Yield plot}^{-1} \times \text{Size of hectare}}{\text{Size of plot}}$$

6. Lint % (GOT):

Cotton seed samples of each genotype were balanced and then ginned using electronic ginning machine. Lint attained from every genotype were weighed and % (GOT) was

premeditated:

$$\text{Lint \% (GOT)} = \frac{\text{Weight of lint in a sample}}{\text{Weight of seed cotton sample}} \times 100$$

Fibre Quality Traits

All fibre quality attributes viz., staple length, uniformity, fiber fineness and staple strength was measured through (HVI-900 SA) in Fiber Tech. Section, CCRI Multan, Pakistan.

Staple Length (mm):

It is length of fibres expressed in millimeters.

Staple strength (g tex⁻¹):

It is the tensile strength of fibre expressed in g tex⁻¹.

Micronaire value (µg inch⁻¹):

Micronaire value is the fineness of fibres measured in µg inch⁻¹.

Uniformity index (%):

Fibre uniformity index was determined in percentage.

Statistical Analysis:

Analysis of variance

The documented replicated data was imperilled to ANOVA method as suggested by Steel et al., 1997.

Genotype and phenotype variations were estimated by technique of Lush, 1940 as;

$$\text{Genotype variance } (\sigma^2_g) = \frac{\text{MSg} - \text{MSe}}{r}$$

Where,

MSg = Genotypes average sum of squares.

MSe = Error average sum of squares.

r = No. of repetitions.

Phenotype variation (σ^2_p) = $\sigma^2_g + \sigma^2_e$

Where,

σ^2_g = genotype variation.

σ^2_e = error variation.

Estimates of broad sense heritability were investigated as outlined by Haymen et al., 1958.

$$\text{Heritability in broad sense (h}^2\text{)} = \frac{\sigma^2_g}{\sigma^2_p} \times 100$$

Where,

σ^2_p = phenotypic variance.

σ^2_g = genotypic variance.

Results And Discussion

1. Analysis Of Variance For Plant Height, Number Of Bolls Plant⁻¹ And Boll Weight

The data recorded for plant height, number of bolls plant⁻¹ and boll weight in different cotton cultivars were subjected to analysis of variance technique and the ANOVA is presented in Table 1. The analysis of variance depicted that the studied cotton cultivars differed non-significantly for plant height, number of bolls plant⁻¹ and boll weight. There were no significant differences in plant height of the studied cotton cultivars. Similarly, they produced statistically at par bolls plant⁻¹ having statistically at par boll weight. These results are in contrast to the previous results of Rehman et al., 2020; Talib et al., 2021; Farooq et al., 2023 and Mehran et al., 2023 who found significant differences for these attributes in cotton genotypes. This might be attributed to the various cultivars assessed in the present investigations as compared to the previous ones.

Table 1. Analysis of variance for plant height (cm), number of bolls plant⁻¹ and boll weight (g) of fifteen cotton cultivars investigated under the agro-ecological conditions of D I Khan.

Source of Variation	DF	Plant height (cm)	Number of bolls plant ⁻¹	Boll weight (g)
Replications	2	782.022	7.7556	0.16956
Cultivars	14	32.498	18.6127	0.09317
Error	28	13.213	7.8746	0.01265
CV%	-	7.82	16.34	12.22

2. Analysis Of Variance For Plant Population, Seed Cotton Yield And Ginning Out Turn

The analysis of variance was performed for the data collected for plant population, seed cotton yield and ginning out turn in different cotton cultivars which are presented in Table 2. The table depicted that there were non-significant differences for seed cotton yield and ginning out turn in different cotton cultivars. However, these cultivars differed significantly from one another regarding plant population. All the cultivars produced statistically at par seed cotton yield and ginning out turn. This non-significant seed cotton yield might be attributed to the non-significant differences in yield components parameters like number of bolls plant⁻¹, boll weight, plant height etc. which were also found to be non-significant. The previous results of Rehman et al., 2025, Mehran et al., 2023 and Talib et al., 2021 also supported these findings. Similarly, Farooq et al., 2023 and Rehman et al., 2020 also found similar trend of diversity in different cotton genotypes.

Table 2. Analysis of variance for plant population (ha⁻¹), seed cotton yield (kg ha⁻¹) and ginning out turn (%) of fifteen cotton cultivars investigated under the agro-ecological conditions of D I Khan.

Source of Variation	DF	Plant population (ha ⁻¹)	Seed cotton yield (kg ha ⁻¹)	Ginning out turn (%)
Replications	2	23010000	9094.3	3.72008
Cultivars	14	42650000**	46941.1	1.47102
Error	28	13070000	18665.3	0.10619
CV%	-	11.35	14.70	3.63

*, ** significant at 5% and 1% probability correspondingly.

3. Analysis Of Variance For Staple Length, Staple Strength, Micronaire And Uniformity Index

The analysis of variance as calculated for staple length, staple strength, micronaire and uniformity index is presented in Table 3. The table depicted that all the studied genotypes were highly significantly different from one another for these fiber quality attributes. All the genotypes performed differently for staple length, strength, uniformity and micronaire values. These results are in complete analogy with the previous findings of Rahman et al., 2020 and Farooq et al., 2023 who also reported similar trend of diversity for the fiber

quality attributes in different genotypes of cotton

Table 3. Analysis of variance for staple length (mm), staple strength (g tex⁻¹), micronaire and uniformity index (%) of fifteen cotton cultivars investigated under the agro-ecological conditions of D I Khan.

Source of Variation	DF	Staple length (mm)	Staple strength (g tex ⁻¹)	Micronaire (g µg inch ⁻¹)	Uniformity index (%)
Replications	2	0.16089	0.88867	0.01622	0.20689
Cultivars	14	1.08660**	3.35010**	0.22784**	1.95260**
Error	28	0.18541	0.50890	0.04122	0.43260
CV%	-	1.62	2.43	4.87	0.80

*, ** significant at 5% and 1% probability correspondingly.

4. Genetic Analysis Of Seed Cotton Yield And Associated Traits

Various genetic components of diversity like genotypic variance, environmental variance, phenotypic variance, broad sense heritability estimates and genetic advance was calculated for seed cotton yield and all the associated traits like plant height, number of bolls plant⁻¹, boll weight and plant population. These genetic components are presented in table 4. It was observed that the environmental variance was higher for all the studied attributes and all these attributes were under the maximum influence of environment and less contribution of genetic component. Due to the more environmental variance, the phenotypic components were much higher than the genotypic component of variance which resulted in moderate heritability for all these traits except boll weight which depicted higher broad sense heritability of 67.97%. The remaining traits depicted moderate heritability which ranged from 31.25 to 43.00 for these studied attributes. The genetic advance was also moderate for almost all the studied attributes on account of maximum influence of the environment. Thus it was suggested that these studied attributes have maximum influence of environment except boll weight in which the genetic variance was higher in comparison to other traits. These results were slightly different from the previous findings of Daget et al., 2022 and Yehia et al., 2022 which might be due to different genetic materials investigated and different environmental conditions in which the material was investigated.

Table 4. Genetic Components Of Seed Cotton Yield And Associated Traits In Cotton Genotypes.

Genetic component	Plant height (cm)	No. of bolls plant ⁻¹	Boll weight (g)	Plant population (ha ⁻¹)	Seed cotton yield (kg ha ⁻¹)
Genotypic variance (Vg)	6.428	3.579	0.0268	9860000	9425.26
Environmental variance (Ve)	13.213	7.874	0.0126	13070000	18665.30
Phenotypic variance (Vp)	19.641	11.453	0.0394	22930000	28090.57
Heritability (H ² _{bs}) (%)	32.72	31.25	67.97	43.00	33.55
Genetic Advance (GA)	19.23	16.24	0.21	21.31	17.67

5. Genetic Analysis Of Fibre Quality Traits

Various genetic components of diversity like genotypic variance, environmental variance, phenotypic variance, broad sense heritability estimates and genetic advance was calculated for ginning out turn, staple length, staple strength, micronaire value and uniformity index. These genetic components are presented in table 5. It was observed that the genetic variance was higher for all the studied attributes while the environmental variances was very low for all these attributes which depicted that these attributes were under the maximum influence of genes and very less contribution of environment. The phenotypic components of variance were slightly higher than the genotypic component of variance which resulted in higher heritability for all these traits except uniformity index which depicted moderate broad sense heritability of 53.94%. The remaining traits depicted higher heritability which ranged from 60.14 to 81.08 for these studied attributes. The genetic advance was also higher for almost all the studied attributes on account of maximum contribution of the genotypic variances. This higher heritability coupled with higher genetic advance suggested that the traits may be controlled by the additive genes and selection in advance generations would be more effective for these traits of quality improvement. These results are in complete analogy with the previous findings of Liaqat et al., 2015 and Jamil et al., 2020 who also reported similar trend for the genetic components of fibre quality attributes in cotton genotypes.

Table 5. Genetic Components Of Fibre Quality Attributes In Cotton Genotypes.

Genetic component	Ginning out turn (%)	Staple length (mm)	Staple strength (g tex ⁻¹)	Micronaire (µg inch ⁻¹)	Uniformity index (%)
Genotypic variance (Vg)	0.4549	0.3003	0.9470	0.0622	0.5066
Environmental variance (Ve)	0.1062	0.1854	0.5089	0.0412	0.4326
Phenotypic variance (Vp)	0.5611	0.4858	1.4559	0.1034	0.9393
Heritability (H ² _{bs})	81.08	61.83	65.05	60.14	53.94
Genetic Advance (GA)	0.72	2.51	0.30	0.28	2.11

6. Number of bolls plant⁻¹

The data pertaining to number of bolls plant⁻¹ as recorded in different cotton cultivars is presented in Table 6. It was depicted that all these cultivars were statistically at par for the number of bolls plant⁻¹. They produced statistically similar number of bolls plant⁻¹.

Table 6. Number of bolls plant⁻¹ of cotton genotypes evaluated under the agro-ecological conditions of D.I.Khan.

Genotypes	Number of bolls plant ⁻¹
CIM-616	25.00
CIM-622	23.67
CRIS-600	30.33
CRIS-641	23.33
IR-NIBGE-7	25.67
VH-Gulzar	23.33
Neelam-131	23.67
Sitara-008	25.67
CEMB-33	27.33
FH-142	19.00
BH-184	25.33
Auriga-216	23.33
Thakkar-80	22.67
IUB-13	24.33

CEMB-66

23.00

LSD_{0.05}

Non-significant

7. Seed Cotton Yield (kg ha⁻¹)

The mean values pertaining to seed cotton yield of different cotton cultivars is presented in Table 7 while its statistical analysis is given in Table 2. It was recorded that various studied cotton cultivars depicted non-significantly different seed cotton yield. However visual differences were observed. More seed cotton yield was observed in cultivar CRIS-600, CRIS-641, VH-Gulzar and CEMB-66.

Table 7. Seed Cotton Yield Of Cotton Genotypes Evaluated Under The Agro-Ecological Conditions Of D.I.Khan.

Genotypes	Seed cotton yield (kg ha ⁻¹)
CIM-616	1676.00
CIM-622	1671.10
CRIS-600	1901.00
CRIS-641	1782.80
IR-NIBGE-7	1531.60
VH-Gulzar	1769.40
Neelam-131	1462.00
Sitara-008	1445.90
CEMB-33	1687.80
FH-142	1665.50
BH-184	1636.00
Auriga-216	1621.00
Thakkar-80	1644.90
IUB-13	1498.20
CEMB-66	1729.30
LSD _{0.05}	Non-significant

8. Staple Strength (g tex⁻¹)

The mean values pertaining to staple strength as recorded in different cotton cultivars are given in Table 8 while its statistical analysis are given in Table 3. It was recorded that there was statistically significant differences in staple strength among these studied

cultivars. The staple strength ranged from 28.30 g tex⁻¹ to 32.20 g tex⁻¹ in these cotton cultivars. Maximum staple strength of 32.20 g tex⁻¹ was recorded in the cultivar CIM-622 followed by the cultivar IUB-13 which depicted 30.70 g tex⁻¹ strength. Whereas minimum staple strength of 28.30 was recorded in Thakkar-80 and CEMB-33 which was at par with the CIM-616, FH-142, CRIS-641 and CRIS-600. All the remaining cultivars depicted moderate staple strength. These results are in complete analogy with the previous findings of Rahman et al., 2020 and Farooq et al., 2023 who also reported similar trend of diversity for staple strength in different cultivars of cotton. The findings of Ahsan et al., 2015, Bilawal et al., 2018, and Akhter et al., 2019 are also in line and supported these results.

Table 8. Staple strength of cotton genotypes evaluated under the agro-ecological conditions of D.I.Khan.

Genotypes	Staple strength (g tex ⁻¹)
CIM-616	28.67 de
CIM-622	32.20 a
CRIS-600	29.43 cde
CRIS-641	29.30 cde
IR-NIBGE-7	30.20 bc
VH-Gulzar	29.70 bcd
Neelam-131	29.93 bc
Sitara-008	29.23 cde
CEMB-33	28.30 e
FH-142	28.50 e
BH-184	29.43 cde
Auriga-216	28.57 de
Thakkar-80	28.30 e
IUB-13	30.70 b
CEMB-66	28.63 de
LSD _{0.05}	1.19

Means not sharing common letters are significantly different from one another

9. Micronaire Value ($\mu\text{g inch}^{-1}$)

The mean values pertaining to micronaire value as recorded in different cotton cultivars are given in Table 9 while its statistical analysis are given in Table 3. It was recorded that there were statistically significant differences in micronaire values among these studied cultivars. The micronaire ranged from $3.57 \mu\text{g inch}^{-1}$ to $4.57 \mu\text{g inch}^{-1}$ in these cotton cultivars. Maximum micronaire value of $4.57 \mu\text{g inch}^{-1}$ was recorded in the cultivar CEMB-66 which was statistically at par with FH-142, CIM-616, VH-Gulzar and CEMB-33 followed by the cultivar CRIS-600 which depicted $4.30 \mu\text{g inch}^{-1}$ micronaire value. Whereas minimum micronaire value of 3.57 was recorded in Auriga-216. All the remaining cultivars depicted moderate micronaire values. These results are in complete analogy with the previous findings of Rahman et al., 2020 and Farooq et al., 2023 who also reported similar trend of diversity for micronaire values in different cultivars of cotton. The findings of Mehran et al., 2023 and Talib et al., 2021 are also in line and supported these results.

Table 9. Micronaire of cotton genotypes evaluated under the agro-ecological conditions of D.I.Khan.

Genotypes	Micronaire ($\mu\text{g inch}^{-1}$)
CIM-616	4.37 abc
CIM-622	4.07 cdef
CRIS-600	4.30 abcd
CRIS-641	3.80 fg
IR-NIBGE-7	4.00 def
VH-Gulzar	4.27 abcde
Neelam-131	4.03 cdef
Sitara-008	4.23 abcde
CEMB-33	4.43 ab
FH-142	4.50 a
BH-184	3.93 ef
Auriga-216	3.57 g
Thakkar-80	4.37 abc
IUB-13	4.10 bcdef

CEMB-66 4.57 a

LSD_{0.05} 0.34

Means not sharing common letters are significantly different from one another

10. Uniformity Index (%)

The mean values pertaining to uniformity index as recorded in different cotton cultivars are given in Table 10 while its statistical analysis are given in Table 3. It was recorded that there was statistically significant differences in uniformity index among these studied cultivars. The uniformity index ranged from 79.97% to 83.40% in these cotton cultivars. Maximum uniformity index of 83.40% was recorded in the cultivar CIM-622 which was statistically at par with CEMB-66, Neelam-131, CIM-616 and VH-Gulzar. Whereas minimum uniformity index of 79.97% was recorded in Auriga-216. All the remaining cultivars depicted moderate uniformity index. These results are in complete analogy with the previous findings of Rahman et al., 2020 and Farooq et al., 2023 who also reported similar trend of diversity for uniformity index in different cultivars of cotton. The findings of Mehran et al., 2023 and Talib et al., 2021 are also in line and supported these results.

Table 10. Micronaire Of Cotton Genotypes Evaluated Under The Agro-Ecological Conditions Of D.I.Khan.

Genotypes	Micronaire ($\mu\text{g inch}^{-1}$)
CIM-616	4.37 abc
CIM-622	4.07 cdef
CRIS-600	4.30 abcd
CRIS-641	3.80 fg
IR-NIBGE-7	4.00 def
VH-Gulzar	4.27 abcde
Neelam-131	4.03 cdef
Sitara-008	4.23 abcde
CEMB-33	4.43 ab
FH-142	4.50 a
BH-184	3.93 ef
Auriga-216	3.57 g
Thakkar-80	4.37 abc

IUB-13	4.10 bcdef
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CEMB-66	4.57 a
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LSD _{0.05}	0.34
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Means not sharing common letters are significantly different from one another

Conclusions and Recommendations

The instant results concluded that various yield components like plant height, number of bolls plant⁻¹, boll weight as well as seed cotton yield were non-significantly different in different cotton cultivars however the plant population significantly differed in these cotton cultivars. Similarly ginning out turn was also non-significant, however these cultivars exhibited higher significant differences for all the fibre quality attributes like staple length, staple strength, micronaire value and uniformity index. It was observed that CIM-622 and CEMB-66 depicted the maximum staple length, strength, micronaire and uniformity index and were found to be the top promising cultivars regarding the fibre quality attributes. These cultivars although produced non-significantly different seed cotton yield, yet produced considerable amount of seed cotton yield as compared to the other cultivars. Similarly, the cultivar CIM-616, VH-Gulzar, CRIS-600 and FH-142 ranked second, also performed much better and depicted considerable fibre quality attributes like staple length, strength, micronaire and uniformity index. Based on these results, CIM-622, CEMB-66, CIM-616, VH-Gulzar, CRIS-600 and FH-142 were found to have considerable seed cotton yield and excellent fibre quality attributes and are recommended for general cultivation under the agro-ecological conditions of the Dera Ismail khan region.

Authors' Contribution

Nasr Ullah Khan, Muhammad Mohibullah and Sundas Batool conceived the idea and designed the study. Hafiz Abdul Basit and Nida Afaqi performed the experiments, collected and analysed the data. Shahana Aziz and Sana Akbar helped in data collection and analysis. Nasr Ullah Khan and Hafiz Abdul Basit drafted the manuscript. All authors read the manuscript before submission.

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