International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

Dependence of the Level of Correlation Links and Structure on Cotton Leaf and Fiber Color

M. Ergashev[1], T. Kuliyev[2]

The advancement of information technology in our lives, as well as in all spheres, has further enhanced the use of statistical methods in biological research, including correlation analysis. Particularly, the new possibilities for the interconnection of the organisms in the biological area have been studied by the correlation analysis carried out by complex computing. As a result, there was a change in the interaction between the quantitative signs of plants (sunflower, wheat, cotton, rice, linseed, soybean) under the influence of the environment. The correlation between the quantitative signs of varieties of cotton sorts were found to be increased in an unfavorable environment and in low-yield genotypes [3, 4].

Ecological-biological, ecological, genotypic and biological indicators were recommended for the selection of process as a result of statistical methods. This, in turn, plays an important role in the successful completion of selection work [1].

There was shown a correlation between the fiber index and the green color of the fiber (with a lower fiber index) in the hybrids that are intertwined with white color cotton fiber (with a high fiber index).

In F2 hybrids derived from the mutations of some lines of genetic collection of National University of Uzbekistan were identified as the result of the study of herpes in the background of plant color:

- The marking sign of the fiber is inherited without the condition of alleles of the plant color gene;
- The green (rprp) and intermediate (Rprp) plants obtained in the second generation were higher than 1000 seedlings weight rather than anthocyanic (RpRp) plants;
- The analogous phenomenon has also been observed in plant color and genetics of yield signs [6].

The main purpose of this research was to determine the variation, determination and the extent and structure of correlations between the quantitative signs of genetic and color of cotton genes. Because these researches are important in carrying out selection works.

As the object of experiment, materials of the genetic collection of cotton of the National University of Uzbekistan and hybrids synthesized with their participation were chosen as colorful and cotton fiber. The experiment was conducted in four variants (Table 1). All phenological observations and calculations were carried out on the basis of the methodical instructions issued by Uzbekistan Research Institute of Cotton. SPSS-14 statistical software was used to calculate correlation (r), determination (r2) and variation (cv,%) between the studied characters [2]. In determining the indication of determinations, R2ch, R2m, N. S. Rostova's method was used to compare the distance between d = 1r r and their correlation matrices [1].

From the initial statistical data we can see that genotype of cotton varies with quantitative indices. If it was 29.17% in green leaf at fiber output, in green leaf with white fiber gene, it was 33.47%. These white fibrous genotypes show that over 4.3% of the plant genotypes with colored fibers have been found to be fibrous. The same results were recorded by the index of the fiber and the length of the fiber. The length of the fiber is 31.25 mm in the 1 variant, 35.12 mm in the 4th variant. The difference between these options is 3.87 mm.

Table 1: Quantitative signs of cotton and their statistical indicators

No	Variants	Fiber output, (%)	Fiber indices, (g)	Weight of cotton boll, (g)	Weight of 1000 seedlings, (g)	Length of fiber, (mm)
1	Green leaf, colored fiber	29,17±0,32	5,52±0,07	4,47±0,07	133,41±1,13	31,25±0,25
2	Yellowish-green leaf, colored fiber	28,39±0,61	5,23±0,13	5,86±0,16	131,98±2,31	30,80±0,52
3	Yellowish-green leaf, white fiber	32,93±0,81	6,16±0,14	6,41±0,17	126,28±3,63	34,80±0,56
4	Green leaf, white fiber	33.47±0.35	6,45±0.09	4.53±0.17	129.04±2.05	35.12±0,32

Statistical analysis of primary data shows that the differences between the options are real. This, in turn, was the basis for switching between the variants to the next stage of calculation. This information is shown in Figure 1. The data in the figure clarified that fiber output (1) (where the number indicates the studied character) and the fiber index (2), 3 and 4 variants of fiber output (1) and 1000 seedling weight (4) are strongly determined (as the square of the correlation coefficient determines the boundary level of the sign depending on the genotype).

In such case, the variation of these characters takes place in the context of others. The length of the fiber (5) was lower in 3 and 4 variants and less varied.

It was noted that cotton weight on the boll (3) was strongly varied in all variants.

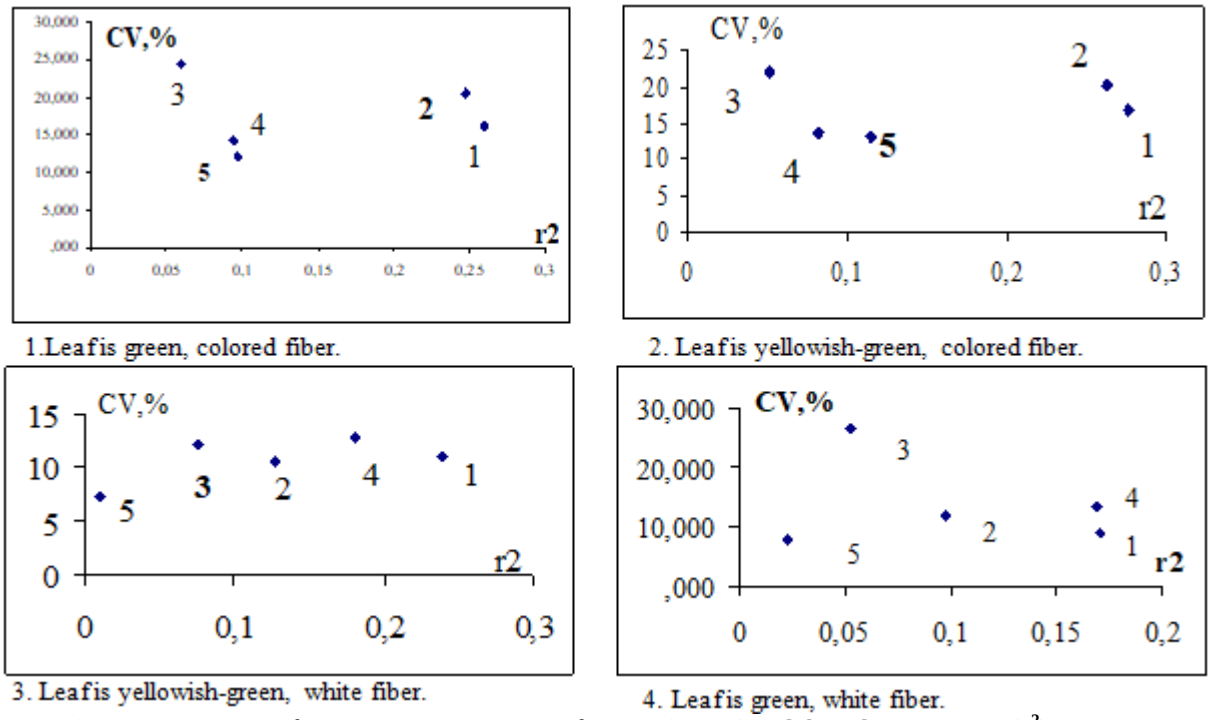

Figure 1: Variation of quantitative parameters of cotton (CV,%) and their determination **(r^2).**
Note: Numbers represent signs: 1-fiber output, 2-fiber index; 3-weight of one boll; 4-weight of 1000 seeds; 5-length of fiber.

Coloring of cotton foliage and fiber influenced the quantitative indices. If the fiber output was strongly determined in all variants, the fiber index was found to be strongly determinant in versions 1 and 2, in the 1000 seed weights 3 and 4. The length of the fiber is low in 3 and 4 variants, that is, in the plant genotypes with white fibers. This has been recognized as an indicator of independent variability.

It was found that strongly varied weight of boll is less determinated.

The color of the leaf and fiber of the cotton also influenced not only variability of the quantitative signs but also the degree of correlation between them (Figure 2). In the genotype of green leaf and colored fiber, strong correlation relationships (r> 0.7) between fiber output (1) and fiber index (2) were recorded. The same result was recorded in version 2. In the 3 variation there was a strong but correlated correlation between the fiber output (1) and 1000 seed weight (4). Similarly, the correlation link was recorded in variant 4 (r = 0.3-0.7).

The figures 1 and 2 show that the degree of correlation between quantitative characters is strong. It also shows the average determinants of the studied characters. The results of calculations in the 1 and 2 variants of the average determining coefficient were 0.16, in the 3 and 4 variants - 0.10. Thus, 1 and 2 variants have created inconvenient conditions for genetic varieties of cotton. This can be explained by an increase in the degree of correlation between plant quantitative symptoms under the conditions found in the science. In our opinion, variants and fibrous color options (1 and 2 variants) have created unfavorable conditions for the 3 and 4 options for cotton genotypes. As a result, the degree of correlation between quantitative signs increases.

The color of the leaf yellowish-green and colored fiber was influenced not only by the correlation link between the studied quantitative characters but also the composition (Figure 3). The quantitative estimates were mainly divided into one correlation group. This group can be called "Amount of Fiber".

The center of the group was contained by fiber output (1) and fiber index (2). Correlation between these indicators was high. Let's mention that the distance between quantitative signs is determined by formula d = 1r. As we have mentioned the higher the correlation coefficient, the closer it is to the distance. The degree of correlation link is as mentioned above in 1 and 2 variants are higher than in 3 and 4 variants.

Comparison of genotype correlation matrices showed that comparing results showed the similarity of green leaf with colored genotypes with green leaf and white fiber genotypes was 64%, and the similarity between 1 and 2 variants was 94%. As you can see from this information, the colored fiber of genotype differs from white fiber genotype. Recall that when the similarity of genotypes is higher than 90%, it is considered to be alike.

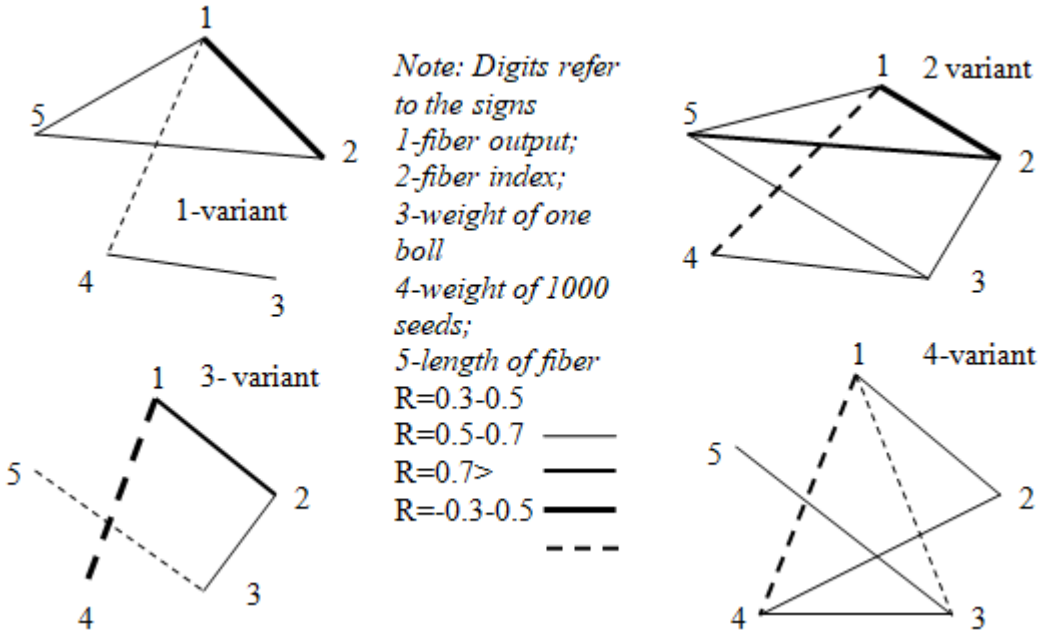

Figure 2: The degree of correlation between the quantitative signs of cotton genetics
Note: 1.- Green leaf, colored fiber; 2- Yellowish-green leaf, white fiber; 3. Yellowish-green leaf, white fiber; 4, Green leaf, white fiber
Note: Digits refer to the signs (figure 1)

The similarity and the difference between the genotypes can be clearly seen from Figure 4. At the top of the picture there are white and fiber genotypes in 3 and 4 variants, and colored fibers genotypes at the bottom.
This information on cotton leaf and color of fiber impacted the level and correlation links between quantitative signs. It was found that colored fibers genotypes differ from white fibers by genotypes.

1) Green leaf and white fiber genotypes of cotton dominated rather than colored leaf and fiber genotypes with their fiber output and length of fibers.
2) Colored fibrous genotypes were found that fiber output and fiber index, white fiber output genotype, and 1000 seedlings weight, and the fiber length was less determinate.
3) A strong correlation was found between the direct fiber output and fiber index and reverse strong correlation links between the fiber output and the weight of 1000 seeds.

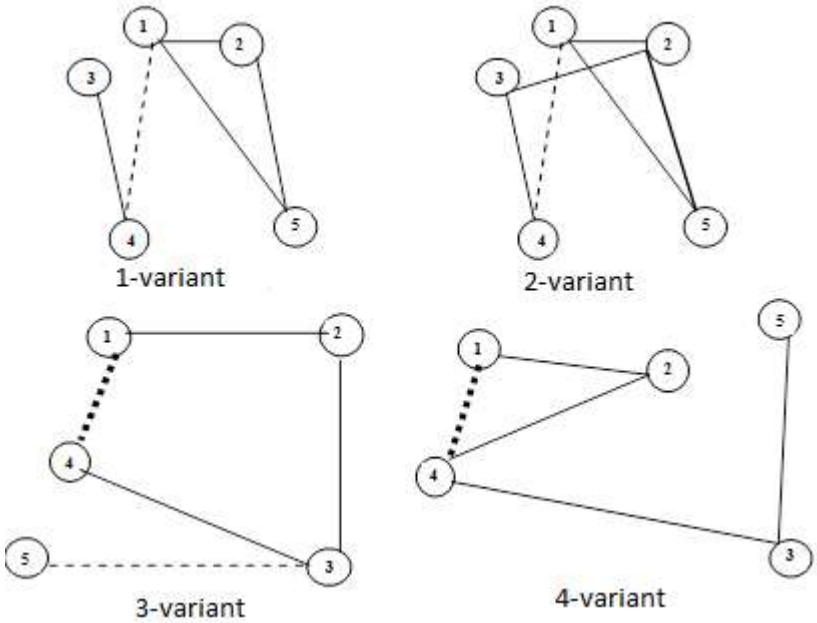

Figure 3: Structure of correlation links
Note: *1-variant- green leaf, white fiber; 2-variant – yellowish-green leaf, colored fiber; 3 -variant- yellowish-green leaf, white fiber; 4-variant- green leaf, white fiber* ***Digits refer to signs****: 1-fiber output; 2-fiber index; 3- weight of one boll; 4- weight of 1000 seeds; 5-fiber length.*

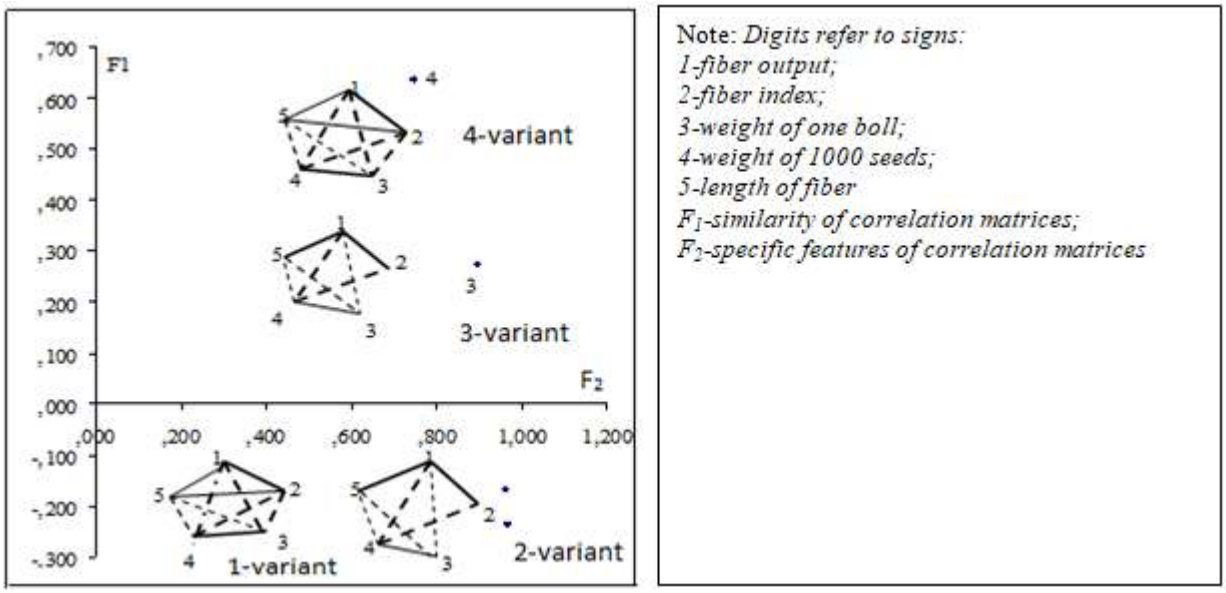

Figure 4: Similarity of correlation matrices

Conclusion

1) The correlation link between the quantitative parameters of the studied cotton found a group called "Amount of fiber". The yellow-green and colored fiber genotypes of the leaf show strong correlation links with the white fiber and green leaf genotypes.
2) The results of comparisons with correlation matrices show that the genotype of the yellowish-green and colored fibers is similar to that of green leaf with white fibers genotype for 64.0%. It witnesses that genotypes with yellowish-green and colored fiber differs from genotypes with white fiber and green leaf.

References

[1] RostovaN.S. Correlations: Structure and determination//Saints Petersburg: Pub. House of Saints Petersburg university, 2002. T.94.S.p.-308
[2] Shishlyannikova L.M. Mathematical planning of scientific work with statistical package SPSS for Windows 11.5.0//Teaching-methodical manual, Moscow, 2005. p.-107.
[3] T.Kuliev, D.Ismoilova. The effect of productivity on the correlation link between the signs of cotton. Agro Science 2 (26), 2013, p. 22-24
[4] T.Kuliev, D.Aliboeva. Impact of external environment on the level and composition of correlation links between the indicators of cotton. Agro science 1 (29), 2014, p. 20-21.
[5] Neely J.W. – Relation of green lint to lint index in Upland cotton. J. Agric. Res., 1943, 66, p. 293-306.
[6] Musaev DA, Zakirov SA, Fatkhullaeva G.N et al. Genetic bases of marking lines of cotton with signal sign lines.//Journal Uzbek biology №3, 2004.-p.75-8