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Identification and Correlation Analysis of Individual Morphical and Economic Traits in Medium-Fiber Cotton

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Abstract: The article analyzes the results of research conducted in an experimental plot established in 2021 in the Tashkent region of the Republic of Uzbekistan to identify the manifestation of individual morpho-economic traits in

Gossypium hirsutum L. varieties and lines, as well as to establish correlation relationships between them. It was established that the highest stem height was observed in the AN-Boyaut-2 variety, and the lowest in the Kelajak variety. The highest number of fruiting branches was noted in the Mehnat variety, while the T-1326 line showed minimal indicators for this trait. The mass of raw cotton in one boll was highest in the T-1391 and T-1278 lines, and lowest in the T-1470 line and the standard Namangan-77 variety. The total number of bolls was highest in the T-826 and UzFA-710 forms, and lowest in the T-8588 and T-1777 lines. At the beginning of September, the highest number of opened bolls was observed in the Yulduz, T-840, UzFA-710, and Kelajak genotypes, while the Namangan-77 variety showed minimal boll opening. Five-lobed bolls dominated in the AN-Boyovut-2, T-8588, Yulduz, and Kelajak genotypes, while four-lobed bolls dominated in the UzFA-707 and UzFA-710 varieties. Fiber length was high in the T-1470 line and UzFA-707, S-6524, UzFA-710, and Kelajak varieties, while this indicator was minimal in the AN-Boyovut-2, Namangan-77 varieties, and the T-8588 line. The fiber yield was highest in the UzFA-710, Mehnat, UzFA-707, Yulduz, T-19, and T-1391 genotypes, while it was lower in the AN-Boyovut-2 variety and the T-1470 line.

It was established that there are both weak positive and negative correlations between individual traits in populations, while a reliable average positive correlation was recorded between the total number and the number of opened bolls.

Keywords: G. hirsutum L., variety, line, population, morpho-economic characteristics, indicators, correlation, analysis.

Introduction.

As in all plants, the presence of correlational relationships in the formation of important traits in cotton leads to differences in indicators between genotypes. Genotype and external environmental factors during plant cultivation and care play a significant role in the manifestation of trait indicators in populations. The correlation phenomenon observed throughout the Earth's flora is also recognized as one of the important processes in the formation of average indicators of morpho-economic traits in cotton genotypes. Different soil and climatic conditions and the agrotechnical measures taken during care significantly influence the results. Furthermore, the influence of the cotton hybrid genome on the formation of characteristic traits of varieties and lines is of significant importance. As with all plants, the interconnectedness of traits in the formation of indicators is also regularly manifested in cotton. Long-term individual selection in populations has shown that the genotype and environmental influence in cotton lead to different developmental forms [6; p. 233-235].

It has been established that the length of the main stem, fruiting branches, and fiber quality in cotton plants are improved through consistent individual selection [10; p. 91-97]. Researchers have noted that the height of the main stem of cotton exhibits a positive correlation both in phenotype and genotype with the total number of bolls and the mass of cotton in the boll [11; p. 29-36].

It has been documented in scientific sources that the mass of cotton in a boll is directly correlated with the number of seeds and their mass in the boll [3; p. 170-172]. A comprehensive study of the processes occurring in the population of the initial forms obtained in genetic and breeding research, building on the patterns of a set of biotypes in genetic equilibrium, expanding the range of variability, and forming a group of plastic plants within the population is crucial [5; p. 138]. Some researchers suggest that the biotypes of cotton varieties and lines that differ in characteristics such as stem height, boll and leaf shape can be the result of modification changes. However, they also conclude that characteristics such as the curvature or straightness of the main stem and base of the capsule are mainly due to hereditary factors, which indicates the genotypic determination of these traits in the population structure [8; p. 205-207]. Continuous individual selection and observation have shown that hybrid generations are formed under the influence of both environmental and hereditary factors. It has been established that in complex hybrid generations, the probability of latent polygenic inheritance always remains. Such polymorphism ensures high heterogeneity and heterozygosity of hybrids, which, in turn, increases the dynamism of the population composition and enhances the effectiveness of individual selection. All qualitative and quantitative traits of plants are regulated by a large number of both primary and modifying genes [7; p. 233-235]. In the study of Sarwar G. et al., based on 4×4 diallel crosses of unique forms *G. hirsutum* L., it was revealed that partial dominance of additive genes manifests itself in such traits as main stem height, number of fruiting branches, number of bolls per plant, fiber mass in the boll, and fiber percentage. Complete dominance, in turn, was observed in relation to the number of seeds in the boll and the seed index [12; p. 2527-2531].

The main industrial raw material obtained from cotton is fiber. Fiber quality largely depends on the genome structure of the variety and the environmental conditions in which the harvest is formed [1; p. 13-16]. Modern cotton genotypes must meet not only the requirements of agricultural technology but also the requirements of the light industry and the international market for fiber quality. In this regard, in genetic-breeding research, special attention is paid to such traits as fiber length, its yield, index, micronaire, and other qualitative characteristics [2; p. 6-7]. Based on the results of analyzing fiber quality and other characteristics in various cotton populations, Soomro A.W. notes the presence of differences between all genotypes, indicating the availability of genetically rich and diverse source material necessary for breeding programs [13; p. 17-20].

According to researchers, the preservation of genetic balance in cotton genotypes located at significant geographical distances is ensured by multifaceted (polymorphic) heredity, high adaptability to various environmental conditions, and enriched gene pool. The mutual complementation of biotypes within such populations contributes to their sustainable development [9; p. 207-208].

According to statistical data obtained during research by Joshi H.J. and co-authors (2006), cotton genotypes show pronounced genetic progress in traits such as fiber yield, fiber mass in the boll, number of fruiting branches, and main stem height, which is due to the influence of genes controlling adaptability [14; p. 302-305]. In cotton populations, it has been established that the number of bolls (mainly five-lobed bolls) has a positive effect on fiber yield from a single boll. This, in turn, facilitates intra-population crossbreeding, contributes to an increase in the number of seeds, and has a positive impact on fiber quality indicators [15; p. 164-196].

Research objective: Determining the correlational relationships between individual morpho-economic traits in plants of genotypes *Gossypium hirsutum* L. constitutes the main goal of this scientific work.

Research Materials and Methods:

The following medium-staple cotton varieties and lines were used as research objects: *Gossypium hirsutum* L.: Kelajak, UzFA-707, UzFA-710, Mehnat, Yulduz, AN-Boyovut-2, T-19, T-41, T-826, T-840, T-1278, T-1326, T-1336, T-1391, T-1470, T-1477, T-1777, T-8588. Namangan-77 and S-6524 varieties were used as control (reference) varieties. Population analysis, comparative morphology, and phenological observations were used in the research. The experiment was based on the randomization method in three repetitions. In 100 plants of each genotype, the height of the main stem was measured using a centimeter ruler, and other morphological characteristics were determined visually and manually. The indicators of fiber mass from one boll, fiber yield, and fiber length were determined under laboratory conditions.

The mass of raw cotton from one boll was determined as the ratio of the total mass of raw cotton to the number of harvested bolls. The fiber quality was measured using "HVI" type equipment in accordance with the Uz DSt 604-2001 standard [24; p. 10]. Fiber yield in the studied genotypes and hybrid plants was calculated using the following formula:

Fiber yield (%) ***(Cotton weight - seed weight) × 100 / Cotton weight***

The degree of correlation between traits was determined by the formula proposed by B.A. Dospexov [7; p. 416]:

$$r = \Sigma (x_i - \bar{x})(y_i - \beta) / \sqrt{[\Sigma (x_i - \bar{x})^2 \times \Sigma (y_i - \beta)^2]}$$ where:

r - correlation coefficient,

x, *y* - average values of the studied features,

n - sample size (number of paired observations).

Interpretation of correlation coefficient values:

$r < 0.33$ - weak connection $r = 0.33$-0.66 - medium $r > 0.66$ - strong

Statistical data processing was carried out using the ANOVA program.

Research Results and Their Discussion:

Analysis of gene control in cotton genotypes and the manifestation of traits specific to specific individuals is an important task in modern breeding and genetic research. When analyzing the main stem height trait, the following average indicators were established for the studied year: Namangan-77 variety - 118.59 ± 0.70 cm S-6524 variety - 115.80 ± 0.88 cm Kelajak - 83.41 ± 0.72 cm UzFA-707 - 122.56 ± 0.64 cm UzFA-710 - 120.99 ± 0.50 cm Mehnat - 118.81 ± 0.62 cm Yulduz - 121.81 ± 0.87 cm AN-Boyovut-2 - 123.14 ± 0.77 cm T-19 - 118.39 ± 0.78 cm T-41 - 122.40 ± 0.85 cm T-826 - 112.52 ± 0.63 cm T-840 - 114.90 ± 0.61 cm T-1278 - 121.40 ± 0.58 cm T-1326 - 123.56 ± 0.61 cm T-1336 - 120.42 ± 0.73 cm T-1391 - 120.66 ± 0.89 cm T-1470 - 119.60 ± 0.80 cm T-1477 - 120.72 ± 0.62 cm T-1777 - 119.71 ± 1.01 cm T-8588 - 118.41 ± 0.83

The highest stem height indicator was observed in the AN-Boyaut-2 variety, while the lowest value was recorded in the Kelajak variety. Despite the relatively low stem height indicators of the Kelajak variety, according to several scientific sources, this variety stands out for its yield and fiber quality [8; p. 205-207], making it promising in breeding work.

As with all plants, the number of fruiting branches in cotton plays an important role in the formation of the main elements of the harvest. When analyzing this trait in the studied varieties and lines, the following average values were obtained: Namangan-77 (control) - 12.31 ± 0.18 pcs., S-6524 - 11.68 ± 0.18 pcs., Kelajak - 11.91 ± 0.18 pcs., UzFA-707 - 11.78 ± 0.17 pcs., UzFA-710 - 11.93 ± 0.18 pcs., Mehnat - 12.34 ± 0.19 pcs., Yulduz - 12.09 ± 0.18 pcs., AN-Boyovut-2 - 11.81 ± 0.19 pcs., T-19 - 11.12 ± 0.17 pcs., T-41 - 11.31 ± 0.17 pcs., T-826 - 11.92 ± 0.18 pcs., T-840 - 12.11 ± 0.18 pcs., T-1278 - 12.02 ± 0.18 pcs., T-1326 - 10.91 ± 0.17 pcs., T-1336 - 11.61 ± 0.18 pcs., T-1391 - 12.10 ± 0.18 pcs., T-1470 - 11.61 ± 0.18 pcs., T-1477 - 12.08 ± 0.19 pcs., T-1777 - 11. The highest number of fruiting branches was recorded in the Mehnat variety, and the lowest in the T-1326 line.

The mass of raw cotton from one boll is considered one of the most important factors determining the yield of cotton hybrids. Therefore, this trait is given special attention in genetic and breeding research. According to the data obtained during the research year, the average values of one boll's weight were: Namangan-77 - 5.42 ± 0.08 g, S-6524 - 5.69 ± 0.09 g, Kelajak - 6.31 ± 0.12 g, UzFA-707 - 5.58 ± 0.09 g, UzFA-710 - 6.07 ± 0.09 g, Mehnat - 6.32 ± 0.11 g, Yulduz - 5.78 ± 0.10 g, AN-Boyovut-2 - 6.12 ± 0.11 g, T-19 - 6.13 ± 0.11 g, T-41 - 6.39 ± 0.12 g, T-826 - 6.23 ± 0.09 g, T-840 - 6.41 ± 0.10 g, T-1278 - 7.09 ± 0.14 g, T-1326 - 6.34 ± 0.11 g, T-1336 - 6.12 ± 0.11 g, T-1391 - 7.11 ± 0.13 g, T-1470 - 5.21 ± 0.12 g, T-1477 - 6.54 ± 0.14 g, T-1777 - 5.90 ± 0.12 g, T-8588 - 6.32 ± 0.13 g.

The highest raw cotton yield per boll was observed in the T-1391 and T-1278 lines. The lowest indicators were observed in the T-1470 and Namangan-77 genotypes. The total number of bolls per plant is also an important factor influencing cotton yield. Even with a small mass of cotton in one boll, their large quantity is capable of ensuring a high total yield compared to forms with large but few bolls.

The results of the analysis of this trait showed the following values: Namangan-77 - 15.78 ± 0.25 pcs., S-6524 - 15.37 ± 0.25 pcs., Kelajak - 15.18 ± 0.25 pcs., UzFA-707 - 15.51 ± 0.25 pcs., UzFA-710 - 16.02 ± 0.24 pcs., Mehnat - 14.94 ± 0.25 pcs., Yulduz - 15.11 ± 0.24 pcs., AN-Boyovut-2 - 15.19 ± 0.24 pcs., T-19 - 15.21 ± 0.24 pcs., T-41 - 15.61 ± 0.24 pcs., T-826 - 16.11 ± 0.27 pcs., T-840 - 15.91 ± 0.25 pcs., T-1278 - 14.72 ± 0.23 pcs., T-1326 - 15.33 ± 0.26 pcs., T-1336 - 15.92 ± 0.25 pcs., T-1391 - 15.20 ± 0.23 pcs., T-1470 - 15.19 ± 0.25 pcs., T-1477 - 14.96 ± 0.21 pcs., T-1777 - 14.78 ± 0.24 pcs., T-8588 The highest indicators for the total number of bolls were recorded in the T-826 line and UzFA-710 variety, while the lowest values were observed in the T-8588 and T-1777 lines.

Conclusion:

Regardless of the yield potential of the varieties and lines, if the harvest falls during the autumn cold and rainy period, the fiber quality can significantly deteriorate. Moreover, such conditions require more labor and expenses for harvesting and storing the crop. Therefore, in breeding work, it is important to consider not only quantitative but also qualitative indicators, as well as the maturation periods of cotton varieties.

In cotton breeding and genetics, along with yield and fiber quality, early maturity, particularly the share of yield opening at the beginning of September, is of great importance. This allows for minimal losses during autumn weather conditions and facilitates harvesting. For this reason, we assessed the share of open bolls in the studied varieties and lines of cotton at the end of the first ten days of September. The average values for the number of opened bolls per plant were: Namangan-77 - 10.61 ± 0.16 pcs. C-6524 - 11.14 ± 0.15 pcs. Kelajak - 11.80 ± 0.18 pcs. UzFA-707 - 11.20 ± 0.19 pcs. UzFA-710 - 10.81 ± 0.19 pcs. Labor - 10.92 ± 0.16 pcs. Yulduz - 12.12 ± 0.20 pcs. AN-Boyaut-2 - 11.21 ± 0.18 pcs. T-19 - 11.50 ± 0.19 pcs. T-41 - 11.60 ± 0.18 pcs. T-826 - 11.44 ± 0.22 pcs. T-840 - 11.99 ± 0.19 pcs. T-1278 - 11.39 ± 0.18 pcs. T-1326 - 10.94 ± 0.18 pcs. T-1336 - 11.73 ± 0.19 pcs. T-1391 - 11.44 ± 0.19 pcs. T-1470 - 10.81 ± 0.17 pcs. T-1477 - 10.98 ± 0.18 pcs. T-1777 - 11.09 ± 0.17 pcs. T-8588 - 11.31 ± 0.19 pcs.

The best early opening indicators were observed in the Yulduz, T-840, UzFA-710, and Kelajak varieties, while Namangan-77 demonstrated the worst values for this parameter. One of the most important factors determining cotton yield is the number of boll blades. Although a large number of 5-stalked bolls can improve yield parameters, the prevalence of 4-stalked bolls in the population can negatively impact overall productivity. However, the main role is played not only by the number of bolls, but also by the total number of bolls, the mass of cotton in one boll, and the mass of 1000 seeds.

Analysis results of the number of boll leaves in the box: Namangan-77 - 4.48 ± 0.08 pcs. C-6524 - 4.55 ± 0.08 pcs. Kelajak - 4.62 ± 0.07 pcs. UzFA-707 - 4.36 ± 0.07 pcs. UzFA-710 - 4.38 ± 0.07 pcs. Labor - 4.55 ± 0.07 pcs. Yulduz - 4.68 ± 0.07 pcs. AN-Boyaut-2 - 4.71 ± 0.07 pcs. T-19 - 4.59 ± 0.07 pcs. T-41 - 4.64 ± 0.07 pcs. T-826 - 4.63 ± 0.07 pcs. T-840 - 4.64 ± 0.07 pcs. T-1278 - 4.49 ± 0.08 pcs. T-1326 - 4.44 ± 0.08 pcs. T-1336 - 4.38 ± 0.07 pcs. T-1391 - 4.41 ± 0.07 pcs. T-1470 - 4.40 ± 0.07 pcs. T-1477 - 4.54 ± 0.08 pcs. T-1777 - 4.43 ± 0.08 pcs. T-8588 - 4.64 ± 0.07 pcs. The AN-Boyovut-2, T-8588, Yulduz, and Kelajak varieties showed maximum values for the number of stems. The lowest number of stems was observed in the UzFA-707 and UzFA-710 varieties.

One of the main characteristics that must be taken into account when developing new cotton varieties in Uzbekistan is fiber length. This indicator is of paramount importance in the textile industry and directly influences the market value of cotton. Fiber length analysis results in medium-fiber G. Hirsutum L. genotypes: Namangan-77 - 33.78 ± 0.10 mm, C-6524 - 34.43 ± 0.11 mm, Kelajak - 34.27 ± 0.13 mm, UzFA-707 - 34.69 ± 0.15 mm, UzFA-710 - 34.40 ± 0.13 mm, Mehnat - 33.80 ± 0.15 mm, Yulduz - 33.60 ± 0.14 mm, AN-Boyovut-2 - 33.61 ± 0.13 mm, T-19 - 34.21 ± 0.12 mm, T-41 - 34.10 ± 0.13 mm, T-826 - 34.11 ± 0.10 mm, T-840 - 34.22 ± 0.11 mm, T-1278 - 34.21 ± 0.14 mm, T-1326 - 34.30 ± 0.12 mm, T-1336 - 34.91 ± 0.14 mm, T-1391 - 34.11 ± 0.14 mm, T-1470 - 34.78 ± 0.13 mm, T-1477 - 34.23 ± 0.14 mm, T-1777 - 33.97 ± 0.15 mm, T-8588 - 33.82 ± 0.14 mm. The highest fiber length indicators were recorded in the T-1336, T-1470, UzFA-707, T-1326 lines, as well as in the C-6524 and Kelajak varieties.

Among the studied cotton forms, the highest fiber yield indicators were recorded in the genotypes **T-1470, UzFA-707, S-6524, UzFA-710, Kelajak,**, while **AN-Boyovut-2, Namangan-77 and T-8588** demonstrated the worst values compared to the other studied samples. Population growth worldwide necessitates a steady increase in demand for cotton fiber. This, in turn, requires special attention from scientific organizations and specialists engaged in the genetics and selection of cotton to the creation of new highly productive forms with high fiber yield.

Fiber yield indicators were: Namangan-77 - **38.40 ± 0.27%** S-6524 **- 35.15 ± 0.25%** Kelajak **- 38.11 ± 0.23%** UzFA-707 **- 39.33 ± 0.20% UzFA-710 - 40.23 ± 0.25%** Mehnat **- 39.40 ± 0.24%** Yulduz **- 39.33 ± 0.20 % AN-Boyaut-2 - 34.57 ± 0.23%T-19** - **39.71 ±.** The highest values were demonstrated by the lines **UzFA-710, Mehnat, UzFA-707, Yulduz, T-19 and T-1391,** and the lowest values were demonstrated by the lines **AN-Boyaut-2** and **T-1470.** It should be noted that, despite the low fiber yield in the T-1470 line, this genotype was distinguished by maximum fiber length. Thus, while maintaining this length and increasing fiber yield, it is possible to achieve a favorable combination of two crucial traits in one genotypic form.

Correlation analysis of morpho-economic traits.

Based on the data collected for 2021, the following correlation relationships were established:Namangan-77: Between the height of the main stem and the number of monopodial shoots: r = 0.304 (average positive), Between the height of the main stem and the total number of bolls: r = 0.472 (average positive), Between the number of opened bolls and the number of monopodial shoots: r = -0.199 (weak negative), Between the number of opened bolls and fiber yield: r = 0.203 (weak positive), Between the number of sympodial shoots and the mass of cotton in a boll: r = -0.168 (weak negative), Between the mass of 1000 seeds and fiber length: r = -0.264 (weak negative) C-6524: Between height of the main stem and the mass of 1000 seeds: r = -0.312 (average negative), Between the number of opened b

Correlation analysis of morpho-economic traits in individual cotton genotypes UzFA-707. An **average negative correlation** was established between the height of the main stem and the number of sympodial branches, as well as the number of opened bolls (r = -0.395*** and r = -0.341***). The number of boll bolls, the mass of raw cotton from one boll, the mass of 1000 seeds, and fiber yield showed **a weak positive correlation** with fiber length (up to r = 0.341***). Between the number of monopodial branches and the number of boll leaves in the boll, as well as the mass of 1000 seeds - **, there is a weak negative correlation** (r = -0.177* and r = -0.171*). Between the sympodial branches and the number of opened bolls **- a weak positive correlation** (r = 0.206*). Fiber length and fiber yield: **weak negative correlation** (r = -0.181* and r = -0.196*). 1000 seed weight and fiber length: **weak positive correlation** (r = 0.254*). **UzFA-710 Main stem height with monopodial and sympodial branches: weak positive correlation (r = 0.235* and r = 0.248*). Total density is an average negative relationship with height (r = -0.323**). Weight of raw cotton per boll and fiber yield: weak negative correlation. The number of stems, the mass of the boll, and the length of the fiber relative to the mass of 1000 seeds have a weak negative correlation. Stem height with sympodial branches and 1000-seed weight: weak negative correlation. Total boll yield and weight of raw cotton from one boll: average positive relationship. Open bolls and fiber length: weak positive correlation. Between the mass of cotton in a boll and the mass of 1000 seeds: weak negative correlation (r = -0.196*). Yulduz Stem height with branches - weak positive,** with fiber length **- medium positive correlation** (up to r = 0.428***). Open bolls **- weak negative correlation** (r = -0.298**). Monopodial branches with capsule weight, 1000 seed weight, and fiber yield - **weak negative.** Between 1000 seeds and the weight of one boll - **average positive correlation** (r = 0.304***). **AN-Boyaut-2** Main stem height with the number of sympodial branches and total boll count - **weak positive correlation,** but with boll mass - **strong negative** (r = -0.498***). Between fiber length and 1000 seed weight **- weak negative,** but between one boll weight and fiber length **- weak positive.** Weak **positive correlation** between boll weight and 1000 seed weight **- . T-19** Stem height and fiber yield, sympodial branches and fiber length, boll weight and 1000 seed weight - **weak positive correlation** (up to r = 0.203*). In the T-41 variety, a moderate positive correlation was found between the height of the main stem and the number of sympodial branches and the weight of 1000 seeds (respectively, r=0.340*** and r=0.405***), with the total number of bolls - a moderate correlation, with the weight of raw cotton in one boll and fiber length - a weak correlation (respectively, r=-0.332***, r=-0.188* and r=-0.192**). A weak positive correlation (r=0.230**) was found between the number of monopodial branches and the total number of bolls, an average correlation between the number of sympodial branches and the total number of bolls, and a weak negative correlation (r=-0.301**, r=0.219* and r=0.223*) between the weight of raw cotton in one boll and fiber length, and a weak positive correlation (r=0.218*) with the weight of 1000 seeds. A weak positive correlation (r=-0.198*) was found between the total number of bolls and the number of opened bolls, a weak positive correlation (r=0.199*) with the weight of raw cotton in one boll, a weak negative correlation (r=-0.205*) with the number of opened bolls and the weight of 1000 seeds, a weak positive correlation (r=0.256*) with fiber yield, a weak negative correlation (r=-0.173*) between the number of boll nests and the weight of raw cotton in one boll.

In the T-1278 line, weak negative correlations were found between stem height and the number of sympodial branches and the total number of bolls (r=-0.236* and r=-0.287**), weak positive correlations with 1000 seed weight (r=0.220*), weak positive correlations were also found between the total number of bolls and the number of opened bolls, the number of opened bolls and fiber length, as well as between fiber length and fiber yield (r=0.167*, r=0.244* and r=0.193*). In the T-1326 line, the height of the main stem correlated weakly negatively with the number of monopodial branches and the mass of 1000 seeds (r=-0.176* and r=-0.188*), a weak positive correlation was found between the total number and the number of opened bolls (r=0.201*), a weak negative correlation with the mass of raw cotton in one boll (r=-0.190*), a weak negative correlation between the total number and the number of open bolls (r=-0.273*), a weak positive correlation between the number of open bolls and the mass of raw cotton in one boll and the mass of 1000 seeds (r=0.196* and r=0.180*).

Weak negative correlations (r=-0.286* and r=0.168*) were found between the number of boll nests and fiber yield, the weight of raw cotton per boll, and the weight of 1000 seeds. In the T-1336 line, the main stem height had a weak positive correlation with the number of sympodial branches (r=0.175*), with the total number of bolls, 1000 seed weight, and fiber yield - a weak negative correlation (r=-0.217*, r=-0.221* and r=0.242*), between the number of monopodial and sympodial branches, the number of sympodial branches and fiber length, 1000 seed weight and fiber length - a weak positive correlation (r=0.215*, r=0.248* and r=0.267*), between the number of sympodial branches and fiber yield, as well as the number of nests in the boll and fiber length - a weak negative correlation (r=-0.167* and r=0.187*). In the T-1391 line, the height of the main stem was weakly negatively correlated with the weight of 1000 seeds, and the number of nests in the boll was weakly negatively correlated with the weight of cotton in one boll (r=-0.208* and r=-0.231*), and a weak positive correlation was found between the number of sympodial branches and the number of opened bolls (r=0.232*). In the T-1470 line, the height of the main stem correlated weakly negatively with the number of opened bolls (r=-0.184*), weakly positively with fiber yield (r=0.229*), weakly negatively with the number of open bolls and the number of nests in the boll (r=-0.191*), weakly positively with the number of nests in the boll and the weight of 1000 seeds (r=0.180*).

In the T-1477 line, a weak positive correlation (r=0.225*, r=0.188* and r=0.254* respectively) was observed between the height of the main stem and the number of sympodial branches, the number of opened bolls, and fiber length, while a moderate negative correlation (r=-0.420***) was observed with 1000-seed weight. A weak negative correlation (r=-0.277*) was observed between the sympodial branches and the weight of 1000 seeds, a weak positive correlation (r=0.252*) with fiber yield, an average negative correlation (r=-0.386***) between the number of opened bolls and the weight of 1000 seeds, and a weak negative correlation (r=-0.282**) between the number of nests in the boll and the weight of 1000 seeds. In the T-1777 line, a weak negative correlation was found between the height of the main stem and the weight of raw cotton in one boll (r=-0.294*), and a medium positive correlation with the weight of 1000 seeds (r=0.401***).

A weak positive correlation (r=0.167*) was found between the number of monopodial branches and fiber length, an average positive correlation (r=0.393***) between the total number of bolls and the number of opened bolls, a weak positive correlation (r=0.209*) between the number of nests in a boll and the mass of raw cotton in one boll, a weak negative correlation (r=-0.225*) between the number of nests and fiber yield, and an average negative correlation (r=-0.333***) between the mass of raw cotton in one boll and the mass of 1000 seeds.

In the T-8588 line, a negative correlation (r=-0.259**) was found between the height of the main stem and the total number of bolls, and a positive correlation (r=0.226*) with the weight of raw cotton per boll. The relationship between the number of monopodial branches and the number of nests in the boll is negative (r=-0.234*), the relationship between fiber length is positive (r=0.209*), the relationship between sympodial branches and fiber length is negative (r=-0.166*), the relationship between the total number of bolls and the number of nests is positive (r=0.199*), and the relationship between 1000 seed weight and fiber yield is negative (r=-0.246*). All of them are identified at a weak level. Analysis of the obtained data shows that in 2021, among all studied genotypes, lines T-1391 and T-1278 were distinguished for the trait of raw cotton mass in one boll; lines T-826 and UzFA-710 for the total number of bolls; lines Yulduz, T-840, UzFA-710, and Kelajak for the number of bolls opened at the beginning of the second ten days of September; lines AN-Boyovut-2, T-8588, Yulduz, and Kelajak for the number of nests in a boll; lines T-1470, UzFA-707, S-6524, UzFA-710, and Kelajak for fiber length; and lines UzFA-710, Mehnat, UzFA-707, Yulduz, T-19, and T-1391 for fiber yield. This allows us to assert that these genotypes have high potential for the indicated traits.

Overall, weak positive and negative correlations, and in some cases, medium correlations, were found between morpho-economic traits in varieties and lines. Especially frequently, a significant positive correlation was observed between the total number and the number of opened bolls. Based on the obtained results, it can be concluded that when cultivating the analyzed cotton genotypes in the fields, timely implementation of agrotechnical and other measures based on their current state, as well as high-quality annual selection and disposal both in field and laboratory conditions, it is possible to achieve positive genetic balance in the population for morpho-economic traits.

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