



CORRELATION RELATIONSHIPS BETWEEN MAIN AGRONOMICALLY VALUABLE TRAITS OF COTTON LINES

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Abstract

This article analyzes the correlation relationships between the duration of the growing season and economically valuable traits in different lines of medium-fiber cotton (*Gossypium hirsutum* L.). The study was conducted in the regions of Tashkent, Fergana, and Kashkadarya, where productivity, fiber yield, fiber breaking strength, seed weight, and other indicators were examined. The results revealed a high positive correlation between yield and the number of bolls ($r = 0.84-0.91$), and a moderate positive correlation between boll size and yield ($r = 0.32-0.61$). In some cases, a negative correlation was observed between earliness and yield. The findings provide a scientific and practical basis for breeding programs aimed at selecting early-ripening, high-yielding, and quality-stable cotton genotypes.

Keywords: Cotton breeding, introgressive line, correlation, growing season duration, earliness, productivity, fiber yield, agronomic traits.



G‘O‘ZA TIZMALARINING ASOSIY QIMMATLI-XO‘JALIK BELGILARI O‘RTASIDAGI KORRELYATSION BOG‘LIQLIKLAR

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Annotatsiya:

Ushbu maqolada o‘rta tolali g‘o‘zaning (*Gossypium hirsutum* L.) turli tizmalarida o‘suv davri davomiyligi va xo‘jalik uchun qimmatli belgilar o‘rtasidagi korrelyatsion bog‘liqliklar tahlil qilinadi. Tadqiqot Toshkent, Farg‘ona va Qashqadaryo viloyatlarida olib borilib, mahsuldorlik, tola chiqimi, tolaning solishtirma uzilish kuchi, chigit vazni va boshqa ko‘rsatkichlar o‘rganildi. Natijalarda hosildorlik bilan ko‘sak soni o‘rtasida yuqori darajada ijobiy bog‘liqlik ($r = 0,84-0,91$), ko‘sak yirikligi bilan hosildorlik o‘rtasida esa o‘rtacha ijobiy bog‘liqlik ($r = 0,32-0,61$) aniqlangan. Ayrim hollarda tezpisharlik va hosildorlik o‘rtasida salbiy korrelyatsiya qayd etilgan. Tadqiqot natijalari seleksion ishlarida tezpishar, yuqori hosildor va sifat ko‘rsatkichlari bo‘yicha barqaror shakllarni tanlash uchun ilmiy-amaliy asos yaratadi.

Kalit so‘zlar: g‘o‘za seleksiyasi, introgressiv tizma, korrelyatsiya, o‘suv davri davomiyligi, tezpisharlik, mahsuldorlik, tola chiqimi, xo‘jalik belgilari.

Relevance of the topic

The analysis of the effectiveness of selection work carried out in the breeding of agricultural crops in many countries of the world shows that the selection methods applied in this process must be adapted to local soil and climate conditions, weather, as well as the technological and socio-economic circumstances of each country. Therefore, in creating new varieties of agricultural



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crops, it is considered a promising direction to evaluate the potential of genotypes simultaneously in several geographical locations and to identify forms with broad adaptability. In this regard, the development of promising varieties based on introgressive lines that combine high yield, superior quality indicators, and economic efficiency with resistance to unfavorable environmental factors is of great scientific and practical importance.

Literature Review

The scientific foundations of developing and applying ecological methods of crop breeding are associated with academician N.I. Vavilov. His follower Ye.N. Sinskaya was among the first to define “ecological breeding” and pointed out a number of problems related to the ecological breeding of perennial forage grasses. Today, the theoretical basis for justifying and effectively carrying out ecological breeding is represented by works such as N.P. Dubinin and Ya.P. Glembovskiy’s “Population Genetics and Plant Breeding” (1976), A.A. Juchenko’s “Ecological Genetics of Cultivated Plants” (1980), A.V. Kilchevskiy and L.I. Khotyleva’s “Ecological Plant Breeding” (1985, 1987), N.G. Simongulyan’s “Genetics of Quantitative Traits in Cotton,” and G.S. Shakhmedova’s studies on “Adaptability of Cotton Varieties to the Conditions of Southern Russia.” An important direction of adaptive breeding, which aims to combine high yield potential in varieties and hybrids with resistance to abiotic and biotic stresses, has also been reflected in the works of domestic researchers such as S.A. Usmanov (2020), S.M. Nabiev (2019), S.A. Egamberdieva (2021), and S.T. Juraev (2022).

Research Results

In ten lines of medium-fiber cotton (*Gossypium hirsutum* L.) grown in three different regions of Uzbekistan, correlation coefficients between the duration of the growing season and certain economically valuable traits were determined. It is well known that in targeted breeding processes, it is necessary to study correlations between different traits. Accordingly, researchers found a close



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relationship between yield and the number of bolls (0.84 to 0.91), and a moderate positive correlation between boll size and yield ($r = 0.32$ to 0.61). A moderate to weak positive correlation (0.28 to 0.39) was observed between yield and seed weight, while a weak negative correlation was found between yield and fiber output. A high degree of conformity was recorded between yield and the weight of 1,000 seeds. A moderate positive correlation was identified between boll size and plant height, and a weak positive correlation between seed weight and fiber length. Typically, seed weight and fiber output showed negative correlation. Identifying forms that combine various inter-trait correlations allows breeders to influence recombination processes occurring in hybrids.

A weak positive correlation between the duration of the growing season and the weight of raw cotton per boll was observed during 2019–2020 ($r = +0.21$ to $+0.48$) (see Table 5.1). In the lines tested in 2018, varying levels of direct correlations were recorded between the mentioned traits, ranging from 0.19 in Tashkent region to as high as 0.94 in Fergana region. A relatively close correlation was also observed in Kashkadarya region, where $r = 0.54$. This indicates that as the growing season lengthened, the boll weight increased. It should be noted that breeders are particularly interested in cases where earliness shows a negative correlation with any economically important trait.

In most cases, no significant correlation was found between the duration of the growing season and the weight of 1,000 seeds ($r = -0.07$ to $+0.03$), or correlations were weak, either negative or positive ($r = -0.21$ to $+0.28$). The groups tested in Fergana region in 2018 were an exception, demonstrating a relatively high correlation of $r = 0.50$. Across all regions and during the three-year trial period, moderate to strong positive correlations were consistently identified between the duration of the growing season and fiber yield ($r = 0.28$ to 0.60).



1 – Table Correlation between the length of the growing season of cotton fields and key valuable economic traits.

Symbol	Area	Years	The growing season	1 bushel weight	Weight of 1000 seeds	Fiber length	Comparative strength	Micronaire	Productivity	Productivity
Growth period	Tashkent	2018	0.19	0.20	0.56	-0.09	0.28	0.74	0.15	-0.75
		2019	0.38	0.28	0.36	-0.05	0.12	-0.12	0.39	-0.33
		2020	0.31	-0.17	0.48	0.24	0.15	-0.24	0.31	-0.46
Growth period	Fergana	2018	0.94	0.50	0.35	0.32	0.50	0.20	0.91	0.08
		2019	0.32	0.03	0.49	0.29	0.59	0.33	0.32	0.19
		2020	0.48	0.04	0.49	-0.10	0.33	-0.02	0.47	0.35
Growth period	Kashkadarya	2018	0.54	0.13	0.60	-0.15	0.39	0.54	0.38	-0.73
		2019	0.21	-0.07	0.28	-0.11	0.38	0.48	0.26	0.42
		2020	0.31	-0.21	0.40	0.35	0.22	-0.11	0.03	-0.07

A very weak correlation was observed between the duration of the growing season and fiber length, ranging from no correlation ($r = -0.05$, $r = -0.07$) to a weak positive correlation ($r = 0.35$). A relatively closer relationship was identified between earliness and fiber breaking strength, with correlation coefficients ranging from 0.12 to 0.59. Correlations between earliness and fiber micronaire values varied across different trial years, ranging from weak negative ($r = -0.24$), to no correlation ($r = -0.02$), to strong positive ($r = 0.74$ in groups tested in Tashkent region in 2018). High correlations were also found between the duration of the growing season and fiber micronaire in groups tested in Kashkadarya region in 2018 and 2019, with coefficients of $r = 0.48$ and $r = 0.54$, respectively. In most cases, a weak positive correlation (0.15 to 0.38) was recorded between the duration of the growing season and productivity. Stronger correlations were found in groups tested in Fergana region, where coefficients reached $r = 0.54$ in 2020 and $r = 0.91$ in 2018. However, no correlation ($r = 0.03$) was observed in the trials conducted in Kashkadarya region in 2020.



A weak negative correlation was observed between the duration of the growing season and yield in Tashkent and Kashkadarya regions in 2018, with coefficients of $r = -0.75$ and $r = -0.73$, respectively. This indicates that early-maturing forms demonstrated higher yields. In the three-year trials in Fergana region, correlations between the studied traits were either weak ($r = 0.19$ and $r = 0.35$) or absent ($r = 0.08$).

Conclusion

It was established that in plants, depending on the growing regions, traits such as fiber yield, productivity, fiber breaking strength, and boll raw cotton weight were strongly associated with the increase in the duration of the growing season. In most cases, no correlation was observed between earliness and the weight of 1,000 seeds. A very weak correlation was identified between earliness and fiber length. Correlations of different levels and directions were recorded between the duration of the growing season and fiber micronaire. For the studied lines, a negative correlation was characteristic between the duration of the growing season and yield.

REFERENCES

1. Dospexov B.A. Metodika polevogo opyta / B. A. Dospexov. - M.: Kolos, 1985. - 351s.
2. Kilchevskiy A.V. Ekologicheskaya seleksiya rasteniy / Institut genetiki i sitologii AN Belarusi, Belorusskaya selskoxozyaystvennaya akademiya.- Minsk: Texnologiya, 1997.- 372 s.
3. Genetiko-ekologicheskie osnovy seleksii rasteniy A.V. Kilchevskiy Vestnik VOGiS, 2005, Tom 9, № 4
4. Juraev S.T. Kachestvennyye pokazateli volokna gibridov xlopchatnika, vyrazhennyy v razlichnykh regionax Uzbekistana // O'zMU xabarlari ilmiy jurnali, Toshkent. №3/2/1., 2021. - S. 45-48.
5. Juraev S.T. Vliyaniye genotipa i usloviy okrujayuyemy sredy na vyyhod volokna u gibridov xlopchatnika razlichnogo geneticheskogo proisxojdeniya. Jurnal



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6. Juraev, S. T. (2022). Changes in the weight of raw cotton in one box in varietary cotton hybrids. Spectrum Journal of Innovation, Reforms and Development, 10, 18-21.
7. Jurayev. S. T. (2022). Yield of cotton lines in different climatic -soil conditions of Uzbekistan. International Scientific Journal Theoretical & Applied Science, 11(1), 310-313.