CHARACTERISTICS OF AGRONOMIC VALUABLE TRAITS AND CORRELATION BETWEEN THEM IN THE L-53 BREEDING LINE LONG STAPLE COTTON G. BARBADENSE L

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Abstract. *The article provides a description of the main agronomic valuable traits of the promising L-53 line. Correlation analysis revealed the interactions between agronomic valuable traits, making it possible to accelerate the selection efficiency when creating new varieties. A negative correlation was established between the fiber output with a weight of 1000 seeds and the length of the fiber.*

Keywords: *Uzbekistan, cotton, lines, a raw cotton weight of one boll, fiber output, fiber length, correlation.*

Introduction. Under conditions of increased continentality of the climate across most of Uzbekistan, it is particularly relevant and important to breed cotton varieties that are resistant to abiotic and biotic stress factors in the environment, which will make it possible to obtain high yields of cotton with high fiber quality. A large potential for increasing yields lies in the creation and introduction of varieties with high yield potential and high quality products that are resistant to damage by dangerous diseases and pests [1]. Due to altering requirements for varieties and the level of development of agricultural production, the process of creating a variety requires continuous adjustment. Pryadun Yu.P. determined the parameters of variety modeling, based on the study of a range of collection and breeding material of released varieties, the economic, morphological and physiological characteristics of spring barley in various zones of the Chelyabinsk region. Relationships between productivity and elements of its structure were established [2].

For a more complete implementation of the yield potential of varieties in the selection process, it is necessary to highlight the elements of the structure of the variety's yield. Cereals have several elements of crop structure, which are formed sequentially one after another during ontogenesis and show a seasonal trend, which is noticeable when environmental factors favorably influence their formation. These elements include such characteristics as tilling, the number of ears, the number of grains and the mass of the grain in an ear. At the first stage of breeding for the creation of a variety model, that takes into account the implementation of its genetic potential within the environmental conditions of the region for which the variety is intended, a targeted search for the source material is required [3].

V.N. Gudzenko et al. recommend carrying out the evaluation of breeding material at the final stage of breeding, under the interactions of a stable manifestation of yield with other economically valuable traits, in a differentiated manner, according to the changing conditions of the years of testing [4]. According to I.N. Shchennikova, obtaining consistently high yields of spring barley grain can only be ensured by varieties that fulfill, at least, three basic requirements: successfully withstand adverse (extreme) impacts of external factors; utilize favorable environmental conditions with maximum efficiency; have high potential productivity [5].

Variety modeling entails not only theoretically substantiating the achieved breeding results, but also substantiating a completely new model for specific soil and climatic conditions, and proposing practical ways for its implementation [6]. The development of an ideal variety model allows the breeder to more efficiently and economically create varieties that are as close as possible to ideal varieties [7, 8].

Results of a study by Usmanov S.A. et al. showed that the genetic groups studied by them are characterized by rather high rates of raw cotton weight of one boll, fiber output and fiber length. An analysis of the population of the studied genetic groups suggests that the use of these genetic groups will make it possible to obtain breeding material with high rates of raw cotton weight of one boll and fiber output [9].

Long-staple cotton has a high agronomic profitability of cultivation. Growing long-staple cotton is much more profitable than medium-staple cotton [10]. It is known from literature data that hybrid offspring may have the most diverse combination of traits, depending on the selection of the initial material. In this regard, a genetic analysis of the forms involved in the selection process is necessary.

Methods. In 2021-2022 in the Tashkent region, a comparative study of the genetic group of the long staple cotton line L-53 was carried out. Seeds of this line have distinctive white downs on the seed micropyle. Sowing was carried out according to the scheme 60x30-1. The research was carried out on the basis of methodological materials for conducting field experiments: “Styles of conducting field experiments” [11]. Statistical processing of the obtained digital material was carried out according to Dospekhov [12] using the Microsoft Excel software package.

Results and discussions. The soil and climatic conditions of the Tashkent region differ significantly from the conditions of the Surkhandarya and Kashkadarya regions, where long staple cotton was traditionally grown. The creation of new breeding materials characterized by precocity, allows for the expansion of the area of cultivation of this type of cotton in almost the entirety of the Republic of Uzbekistan. The varieties of long staple cotton grown at present have a small raw cotton weight of one boll and a fiber output. To increase the profitability of growing varieties of long staple cotton, it is necessary to increase the values of these traits.

Table 1 presents the characteristics of agronomic valuable traits and the correlation coefficients between them. From the data presented, it can be seen that the average raw cotton weight of one boll in 2022 was 4.3 g. The limit of variability of this trait in 2021 was in the range of 3.8-4.5g, and in 2022; an expansion of the limit of variability of the raw cotton weight of one boll of 3.1-5.5g was noted. It should be particularly noted that in 2022, the number of plants with a raw cotton weight of one boll of more than 4.0 g amounted to 72% of the total number of plants studied.

The average fiber output did not have significant differences depending on the year of cultivation and amounted to 35.1-35.5% with a variability limit of 31.9-40.9% in 2021 and 32.0-40.6% in 2022. The study of the variation series of this indicator showed that in 2022 year, 48.6% of plants had a fiber output of more than 36.0%.

A slight increase in the weight of 1000 seeds in 2022 year was observed. The average weight of 1000 seeds, depending on the year of study, was 128 and 135 g. The limit of variability of this trait in 2022 year was wider and amounted to 104-158g. The raw cotton weight of one boll trait is closely related to the trait of the weight of 1000 pieces of seeds, which is clearly seen both in terms of average values and in terms of the variability limit of these traits.

Table 1

Characteristics of agronomic valuable traits and correlation coefficients of the L-53 line (2021-2022 year)

		2021	2022
agronomic valuable traits (average per plant)	raw cotton weight of one boll, g Limit of variability	4,1±0,05 3,8-4,5	4,3±0,03 3,1-5,5
	fiber output, % Limit of variability	35,1±0,55 31,9-40,9	35,5±0,16 32,0-40,6
	weight of 1000 seeds, g Limit of variability	128±2,27 111-145	135±0,74 104-158
	fiber length, мм Limit of variability	40,2±0,26 38,2-42,4	41,2±0,10 38,0-44,0
correlation coefficients between traits	raw cotton weight of one boll – fiber output	-0,31	0,07
	raw cotton weight of one boll – weight of 1000 seeds	0,24	0,18
	raw cotton weight of one boll – fiber length	0,81	0,11
	fiber output – weight of 1000 seeds	-0,53	-0,44
	fiber output – fiber length	-0,76	-0,20
	weight of 1000 seeds – fiber length	0,41	0,13

The average fiber length in 2022 year was 1 mm higher compared to 2021 year, with a variability limit of 38.0-44.0 mm. In 2022 year, 58.9% of the plants studied had a fiber length of more than 41.0 mm.

When working with breeding material, it is very important to know the correlation dependence of the main agronomic valuable traits. In the data presented in table 1, we see that in 2021 year there was a moderately negative relationship between the characteristics of the raw cotton weight of one boll and the fiber output. In 2022 year, this dependence was insignificant, in the studied plants. This indicates a correctly conducted selection among plants grown in 2021 year. A slight dependence of 0.18-0.24 was noted between the traits of the raw cotton weight of one boll and the weight of 1000 seeds, and the indicators of the correlation coefficient between the traits of the raw cotton weight of one boll and fiber length decreased significantly in 2022 year, from a weak to a high degree in 2021 year. This can also be justified by the result of the selection work in 2021 year. Among the traits, the output of the fiber observed a moderate level of a negative relationship, in the range of -0.44 - -0.53. Between the traits of fiber output and fiber length in 2021 year, a highly negative relationship was noted, and in 2022 year, this value decreased significantly, amounting to -0.20. There was also a decrease in the dependence of the weight of 1000 seeds and fiber length from a moderately positive level in 2021 year to a low positive level in 2022 year.

Conclusions. Based on the analysis of the research results, a slight increase in the average values of the main agronomic valuable traits of the population of the L-53 line, and in particular the raw cotton weight of one boll and the length of the fiber, was observed. According to the results of studies conducted in 2022 year, a significant number of plants with high rates of agronomic valuable traits, with a marked breeding value, were identified. The results of the correlational

studies showed the need for such studies when working on breeding material. The decrease in the values of negative correlations between the agronomic valuable traits makes it possible to select plants with a set of traits to create competitive varieties and donors of long staple cotton.

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