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EXPRESSION OF CERTAIN MORPHOLOGICAL TRAIT INDICATORS IN THE T-826 LINE OF GOSSYPIUM HIRSUTUM L.

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Abstract:

This article presents a comparative analysis of the morpho-economic traits of the T-826 line belonging to *Gossypium hirsutum* L. with the standard varieties Namangan-77 and S-6524. The study was conducted in 2023 under the conditions of the Tashkent region based on phenological observations of 100 plants.

According to the analysis results, the main stem height of the T-826 line was 114.8 cm, which was lower than that of Namangan-77 (117.5 cm) and S-6524 (118.1 cm). However, in terms of the number of fruiting branches, T-826 (12.3 branches) showed higher values compared to both standard varieties (11.7 and 11.0 branches, respectively).

The T-826 line also demonstrated superiority in the number of locules per boll (4.70) compared with Namangan-77 (4.40) and S-6524 (4.61). In general, although the T-826 line exhibited a relatively shorter plant height, positive differences were observed in generative traits (yield components).

The obtained results indicate that the T-826 line can be considered a promising source with high yield potential for use in cotton breeding programs.

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Keywords: *G. hirsutum* L., line, main stem height, fruiting branches, bolls, locules, indicators.

Introduction

Different expression patterns of plant height traits in cotton genotypes have been confirmed in scientific sources [1, 2].

Increasing the number of bolls in cotton provides an opportunity to obtain high yields from limited land areas and helps overcome agrotechnical problems, which is considered one of the priority tasks of breeding and seed production sciences [5].

In medium-fiber cotton, the application of directed selection methods starting from the first, second, and third filial generations is considered appropriate for associating complex traits and characteristic features with phenotypic expressions, as well as for maintaining these traits stably in subsequent generations [3].

Studies conducted by researchers have shown that the number of fruiting branches, morphological characteristics, and main stem height in cotton are jointly influenced by genotype and environmental factors [6].

It has been reported that, in the initial forms involved in hybridization, the use of main stem height and other morphological traits allows the selection of genotypes with stable characteristics from among genotypes with diverse phenotypic expressions as early as the second generation through individual selection methods, thereby ensuring phenotypic adaptability [4].

Studies on *Gossypium hirsutum* L. have demonstrated that additive gene effects with partial dominance are expressed in traits such as main stem height, number of fruiting branches, number of bolls per plant, cotton weight per boll, and fiber yield. At the same time, complete dominance has been observed in the number of seeds per boll and seed index [7].

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Research Objective

The main objective of this study was to compare and evaluate the population composition indicators of morphological traits such as main stem height, number of fruiting branches, and number of locules per boll in the new medium-fiber cotton T-826 line developed at the Institute of Genetics and Experimental Plant Biology of the Academy of Sciences of the Republic of Uzbekistan, in comparison with standard varieties, and to assess its breeding significance.

Analysis and Results:

The data obtained from 100 plants of the T-826 line for traits including main stem height, number of fruiting branches, and number of locules per boll serve as an important scientific basis for evaluating their significance in the breeding process and determining productivity stability.

Table 1 Indicators of Morpho-Economic Traits in Cotton Genotypes

No.	Varieties	Traits	$X \pm m$	σ	v
1	2	3	4	5	6
2	Namangan-77 (Standard-1)	Main stem height (cm)	117.5±0.48	3.20	2.72
	S-6524 (Standard-2)		118.1±0.63	4.20	3.56
	T-826		114.8±0.47	3.15	2.74
3	Namangan-77 (Standard-1)	Number of fruiting branches (pcs)	11.7±0.20	1.30	11.0
	S-6524 (Standard-2)		11.0±0.21	1.38	12.5
	T-826		12.3±0.20	1.31	10.6
5	Namangan-77 (Standard-1)	Number of locules per boll	4.40±0.07	0.49	11.2
	S-6524 (Standard-2)		4.61±0.07	0.49	10.6
	T-826		4.70±0.07	0.46	9.80

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According to the data presented in the table, the analysis of main stem height showed that the average value was 117.5 ± 0.48 cm in the Namangan-77 variety and 118.1 ± 0.63 cm in the S-6524 variety. In the T-826 line, this indicator was 114.8 ± 0.47 cm, which was slightly lower compared to the standard varieties. The variance (σ) values were 3.20, 4.20, and 3.15, respectively, while the coefficient of variation ranged from 2.72 to 3.56%, indicating a low level of variability for this trait.

According to the analysis results for the number of fruiting branches, the Namangan-77 variety showed 11.7 ± 0.20 branches, the S-6524 variety 11.0 ± 0.21 branches, and the T-826 line 12.3 ± 0.20 branches. This indicates the superiority of the T-826 line in terms of the number of fruiting branches. The variance ranged between 1.30 and 1.38, while the coefficient of variation was 10.6–12.5%, suggesting a moderate level of variability for this trait.

In the analysis of the number of locules per boll, the Namangan-77 variety had 4.40 ± 0.07 locules, the S-6524 variety had 4.61 ± 0.07 locules, and the T-826 line had 4.70 ± 0.07 locules. This demonstrates the superiority of the T-826 line over the standard varieties for this trait. The variance ranged from 0.46 to 0.49, while the coefficient of variation was 9.80–11.2%, indicating a relatively low level of variability.

In general, although the T-826 line was slightly inferior to the standard varieties in terms of main stem height, it was distinguished by positive differences in the number of fruiting branches and the number of locules per boll. This indicates that the T-826 line is a promising genotype with important breeding value.

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