



**EXPRESSION OF INDICATORS BASED ON
CERTAIN MORPHOLOGICAL TRAITS IN THE
COTTON VARIETY “KELAJAK-3” OF G.
HIRSUTUM L.**

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Abstract

This article presents the results of research conducted in 2023 to evaluate the average indicators of certain morphological traits of the new medium-fiber cotton variety “Kelajak-3”, developed by breeders of the Republic of Uzbekistan. The traits studied included plant height, number of fruiting branches, branching type, and number of locules in bolls. These indicators were compared with the standard varieties Namangan-77 and S-6524.

The results showed that under the conditions of the experimental field in the Tashkent region, the average plant height of the Kelajak-3 variety was 82.5 cm, the number of fruiting branches was 12.2, the branching type was 1.99, and the number of locules in bolls was 4.72.



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In terms of overall productivity, this cotton variety demonstrated positive differences compared to the standard varieties. Based on the obtained results, conclusions and recommendations were provided regarding the wider introduction of this cotton variety into agricultural production and its use in breeding programs.

Keywords: *G. hirsutum L., variety, plant height, fruiting branches, branching type, bolls, locules, indicators.*

Introduction

Using the directed selection method in the F₁, F₂, and F₃ generations of cotton, it is possible to associate a complex of traits and characteristics with specific phenotypes and ensure their continuation in subsequent generations [5].

The use of plant height and other characteristics of the initial parental forms involved in hybridization allows, already in the second generation, the identification of genotypes with different expressions. Through repeated individual selection of these genotypes, it becomes possible to obtain stable genotypes and adapt them to desirable phenotypic characteristics [6].

Scientific sources indicate that the plant height trait varies considerably among cotton genotypes [3,4].

The branching degree of newly developed intensive cotton varieties is one of the important factors influencing high productivity. Increasing the number of bolls allows obtaining higher yields from relatively small areas of land. Therefore, solving the issues related to improving yield components remains one of the most important priorities facing the fields of genetics, breeding, and seed production [7].

S. Gul and N.U. Khan reported that the general variability of the number of fruiting branches, plant morphology, and plant height is influenced simultaneously by both genotype and environmental conditions [8].

In studies conducted by Sarwar G. and co-authors, who performed 4×4 diallel crosses using unique forms of *Gossypium hirsutum* L., partial dominance of



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additive genes was observed for traits such as plant height, number of fruiting branches, number of bolls per plant, boll weight, and fiber percentage. In contrast, complete dominance was observed for the number of seeds per boll and the seed index [9].

According to researchers, plant productivity is one of the main and most complex traits of cotton, which depends on the number and weight of bolls, the number of locules per boll, and the number of seeds within the boll [2].

Researchers who studied all opened bolls of cotton plants by harvesting them and analyzing indicators such as boll weight, number and weight of seeds, fiber yield, fiber index, number of locules per boll, and number and weight of seeds per locule, concluded that studying the variability of these traits within a single plant allows a deeper understanding of the plant's response to environmental conditions [1].

Research Objective:

The aim of this study was to determine the population parameters of morphological traits such as plant height, number of fruiting branches, branching type, and number of locules per boll in the newly developed medium-fiber cotton variety "Kelajak-3", created at the Institute of Genetics and Experimental Plant Biology of the Academy of Sciences of the Republic of Uzbekistan, and to evaluate their significance for breeding.

Analysis and results:

The data obtained from studying 100 plants of the cotton variety "Kelajak-3" for traits such as plant height, number of fruiting branches, branching type, and number of locules per boll play an important role in evaluating the significance of these traits in the selection process and the stability of productivity.



Indicators of Morphological and Agronomic Traits of the Kelajak-3 Variety

No	Varieties	Traits	$X \pm m$	σ	v (%)
	Namangan-77 (Standard-1)	Plant height (cm)	117.5 ± 0.48	3.20	2.72
	S-6524 (Standard-2)		118.1 ± 0.63	4.20	3.56
	Kelajak-3		82.5 ± 0.48	3.20	3.87
1	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
	Kelajak-3		12.2 ± 0.24	1.58	12.9
2	Namangan-77 (Standard-1)	Branching type	2.01 ± 0.09	0.61	30.4
	S-6524 (Standard-2)		1.83 ± 0.10	0.68	37.3
	Kelajak-3		1.99 ± 0.10	0.64	32.3
3	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
	Kelajak-3		4.72 ± 0.07	0.45	9.56

In the study, the cotton variety Kelajak-3 was evaluated in comparison with the standard varieties Namangan-77 and S-6524 based on morphological and agronomic traits. The obtained results are presented in the table.

When analyzing the plant height trait, the 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 Kelajak-3 variety, this indicator was 82.5 ± 0.48 cm, which is significantly lower compared to the standard varieties. The dispersion values (σ) for this trait were 3.20, 4.20 and 3.20, respectively. The coefficient of variation (v) ranged between 2.72–3.87%, indicating a low level of variability for this trait.

According to the results of the analysis of the number of fruiting branches across genotypes, the Namangan-77 variety had 11.7 ± 0.20 , the S-6524 variety had 11.0 ± 0.21 , and the Kelajak-3 variety had 12.2 ± 0.24 branches per plant. This indicates that the Kelajak-3 variety has a slightly higher value compared to the standard varieties. The dispersion values ranged between 1.30–1.58, while the coefficient of variation was 11.0–12.9%, indicating a moderate level of variability for this trait.

When analyzing the branching type, the values were 2.01 ± 0.09 in Namangan-77, 1.83 ± 0.10 in S-6524, and 1.99 ± 0.10 in Kelajak-3. The coefficient of variation



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ranged between 30.4–37.3%, indicating a relatively high level of variability for this trait.

For the number of locules per boll, the value was 4.40 ± 0.07 in Namangan-77, 4.61 ± 0.07 in S-6524, and 4.72 ± 0.07 in Kelajak-3. This shows that the Kelajak-3 variety had slightly higher values compared to the standard varieties. The dispersion values ranged from 0.45–0.49, and the coefficient of variation ranged between 9.56–11.2%, indicating relatively low variability for this trait.

Overall, although the plant height of the Kelajak-3 variety was lower than that of the standard varieties, it exhibited higher values for the number of fruiting branches and the number of locules per boll, which indicates that this variety possesses valuable agronomic traits.

According to the calculations, the plant height of the Kelajak-3 variety was 35.0–35.6 cm lower than that of the standard varieties, indicating that this variety belongs to relatively short-statured cotton plants.

However, the number of fruiting branches was 0.5 higher than Namangan-77 and 1.2 higher than S-6524.

In terms of branching type, the Kelajak-3 variety was 0.02 lower than Namangan-77, but 0.16 higher than S-6524.

Regarding the number of locules per boll, Kelajak-3 exceeded Namangan-77 by 0.32 and S-6524 by 0.11, indicating a certain advantage of the Kelajak-3 variety in terms of yield components.

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