
STUDY OF FIBER YIELD TRAIT FORMATION IN F¹ HYBRID PROGENY OF G. HIRSUTUM L. WITH SYMPODIAL BRANCHING TYPE

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Abstract

This article presents data obtained in 2025 on the formation of the fiber yield trait in F¹ hybrid progeny resulting from crosses between introgressive forms and a number of collection varieties belonging to foreign breeding programs.

Keywords: Cotton, breeding, combination, standard, hybrid progeny, plant, fiber yield.

Introduction

Today, cotton breeders in our country face the important task of developing new varieties with short fruiting branches and a large number of sympodial branches, characterized by rapid boll formation and maturation, a compact plant shape and early ripeness, meeting the modern requirements of agricultural production, as well as being adapted to mechanized harvesting and possessing a complex of valuable agronomic traits.

For this reason, a key objective of modern cotton cultivation is to develop and introduce into production new varieties with high fiber yield that are not inferior to foreign varieties in terms of their parameters.

It is well known that, since fiber is the primary product of cotton, increasing its quantity is of great practical importance. This trait, in particular, occupies a prominent place in terms of its productive potential. Indeed, fiber yield is the primary agronomic trait that determines the economic value of a variety. The study of the genetic nature of this trait, its inheritance from generation to generation, and the development and commercialization of new varieties with fiber yield parameters not inferior to foreign varieties represent one of the important tasks facing cotton breeders in our country.

F.S. Razokova established that, in geographically distant F¹ hybrid plants of cotton, the fiber yield trait was inherited with a bias toward the maternal form. In those studies, varieties from Turkish breeding programs with high fiber yield were used as the maternal form, while local varieties served as the paternal form [1].

I.T. Kakharov emphasized that, in geographically distant cotton hybrids, heterosis was observed in the F¹ generation and was retained in F², and that numerous cases of transgressive variation were recorded for valuable agronomic traits. He also noted that it is advisable to use local varieties and lines as the maternal form when developing early-maturing varieties with high fiber yield [2].

P.Sh. Ibragimov and B. Begimkulov succeeded in obtaining recombinants with wilt resistance and valuable agronomic traits by crossing local medium-fiber cotton varieties (Bukhara-6, S-2610, S-2609) with American varieties (Acala 72 and Acala 74) [3].

D.A. Musaev et al. obtained introgressive lines through complex hybridization of interspecific geographically distant forms of cotton: [F_1 (G. barbadense L. \times Peruvian ruderal subspecies G. barbadense L.) \times G. thurberi]. By crossing the resulting lines with medium-fiber varieties 108-F, S-4727, and Acala, they succeeded in selecting valuable recombinants with superior fiber quality and wilt resistance [4].

Materials and Methods

The research material consisted of F_1 hybrids obtained by crossing introgressive forms—developed with the participation of diploid species G. trilobum Skovsted, G. lobatum Gentry, G. harknessii Brandg., as well as ruderal forms G. hirsutum L. ssp. yucatanense and G. hirsutum L. ssp. punctatum var. purpurascens (Poir.) Mauer—with a number of collection varieties from foreign breeding programs possessing early maturity, wilt resistance, and high fiber quality and yield. The medium-fiber cotton varieties Namangan-77 and S-6524 were used as standards.

All data were processed using a computer program built on formulas for large and small statistical samples according to the method of B.A. Dospekhov.

Analysis and Results

In the present study, we analyzed how the fiber yield trait develops in the early hybrid generations of ecologically and geographically distant hybrids involving introgressive forms.

In the F_1 generation, fiber yield values were found to be high. Specifically, the fiber yield of these hybrids ranged from 36.5% to 45%. The coefficient of variation ranged from 2.75% to 11.77%. In 9 combinations, fiber yield exceeded 40%. Upon crossing introgressive forms with high-fiber-yield varieties, we observed that fiber yield in the first generation reached 39–40% and even higher (Table 1).

Table 1. Formation of the Fiber Yield Trait in F¹ Hybrid Combinations

No.	Hybrid Combinations	n	X ± Sx	S	V%
1.	Namangan 77	65	38.2	—	—
2.	S-6524	69	34.4	—	—
3.	F ¹ S-171 × S-6006	63	37.0 ± 0.54	1.54	4.16
4.	F ¹ S-6006 × S-171	72	37.9 ± 0.38	1.37	3.60
5.	F ¹ L-555 × S-6006	48	34.3 ± 0.40	1.12	3.27
6.	F ¹ S-6006 × L-555	61	39.1 ± 0.94	2.30	5.88
7.	F ¹ L-555 × L-248	62	39.3 ± 1.09	2.88	7.34
8.	F ¹ L-248 × L-555	48	37.4 ± 1.33	3.53	9.43
9.	F ¹ EL × L-249	62	39.5 ± 0.43	1.28	3.23
10.	F ¹ L-249 × EL	35	39.5 ± 0.45	1.36	3.45
11.	F ¹ S-2016 EG × S-2016	66	39.8 ± 0.56	2.45	6.16
12.	F ¹ S-2016 × S-2016 EG	71	36.9 ± 0.44	1.17	3.18
13.	F ¹ [F ₆ ^(F7) L-249 × L-H) × L-199]	65	38.1 ± 0.66	1.86	4.87
14.	F ¹ [L-199 × F ₆ ^(F7) L-249 × L-H)]	52	43.8 ± 0.35	1.18	5.12
15.	F ¹ L-247-Zash-2014 × L-248	64	37.3 ± 0.78	2.35	6.31

Conclusion

In our research, complete dominance of the fiber yield trait was observed in the majority of F¹ hybrids. This can be explained by the relatively similar performance of the parental forms with respect to this trait. These hybrids are recommended for further study in subsequent breeding processes.

References

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