European Journal of Agricultural and Rural Education (EJARE)
Available Online at: https://www.scholarzest.com
Vol. 6 No. 12 December 2025
ISSN: 2660-5643

INFLUENCE ON THE INHERITANCE, VARIABILITY AND FORMATION OF FIBER YIELD TRAITS IN F1- F3 PLANTS

[1]Xamidullayev Toxir Xamidulla o'g'li
Head of the laboratory for selection of grain and legume crops and seed production of the Tashkent Scientific Experimental Station of the Research Institute of Grain and Legume Crops, Doctor of Philosophy in agricultural sciences
[2]Mirboboyev Mirvaqqos O'tkirovich
Head of the Department of Agricultural Engineering and Plant Protection.

Article history:

Received: 24th September 2025
Accepted: 20th October 2025

Abstract:

In the article, the highest index of fiber output in F3-F4 plants is 39.4% in the Surkhon-14 variety, 38.8% in the Raider-276 sample, and 41.3% among the F3 plants (F3Surkhon-14 x Line- 45-2-1-2-37) fiber output combinations F3Raider-276 x Surkhon-14,F3S-6524 x Raider-276,F3 Namangan-77 x Line-45-2-1-2-37,F3Lonren- 1 x Surkhan-14 combinations showed a fiber output of not less than 39%, and in F4 plants, combinations with Surkhan-14 variety showed more than 39%.

Keywords: Breeder, climate, soil, speed, yield, fiber yield, heredity, variety, sample, hybrid, trait, seed, dominance, combination, variation.

INTRODUCTION. Among more than 100 cotton-growing countries of the world, Uzbekistan ranks 6th in cotton area and 10th in average fiber yield (0.75 t/ha). Most of the cotton varieties grown in production were created by crossing genetically close varieties, and these varieties do not fully meet the current requirements for some economic traits. Therefore, breeders are required to solve the urgent problem of creating new cotton varieties suitable for cultivation in different soil and climate conditions, quick ripening, high fiber yield and quality, and resistant to diseases and pests.

G. hirsutumL of cotton as an object of research. local S-6524, Namangan-77, local Surkhon-14 varieties belonging to G. barbadense L. and genetically different ecological-geographically distant Raider-276, Lonren-1, Line-45-2-1- brought from the USA Samples 2-37 and their hybrids were used.

Research results. Cotton is grown mainly for its fiber, and the introduction of varieties with high fiber yield into production is of great importance. That is why special attention is paid to fiber output when evaluating, selecting or creating the starting material.

Fiber yield is a complex polygenic trait that varies under the influence of various factors and ranges from 25-40% in varieties and samples. Most of the scientists studying the heredity of fiber output Straumal, [116; p. 214, 115; p. 34-39]; Simongulyan [113; pp. 22-24]; Ibragimov [205; p. 42] paid special attention to carrying out long cross-breeding.

B.I.Mamarahimov, M.I.Kholikova, A.Kholmurodov and Kh.Saydaliev [72; pp. 67-71] studied the inheritance of fiber yield in interspecies hybrids and showed the superiority of the sample with high fiber yield in the F1 joint when varieties participated as mothers in the hybrids. observed that the inheritance is intermediate.

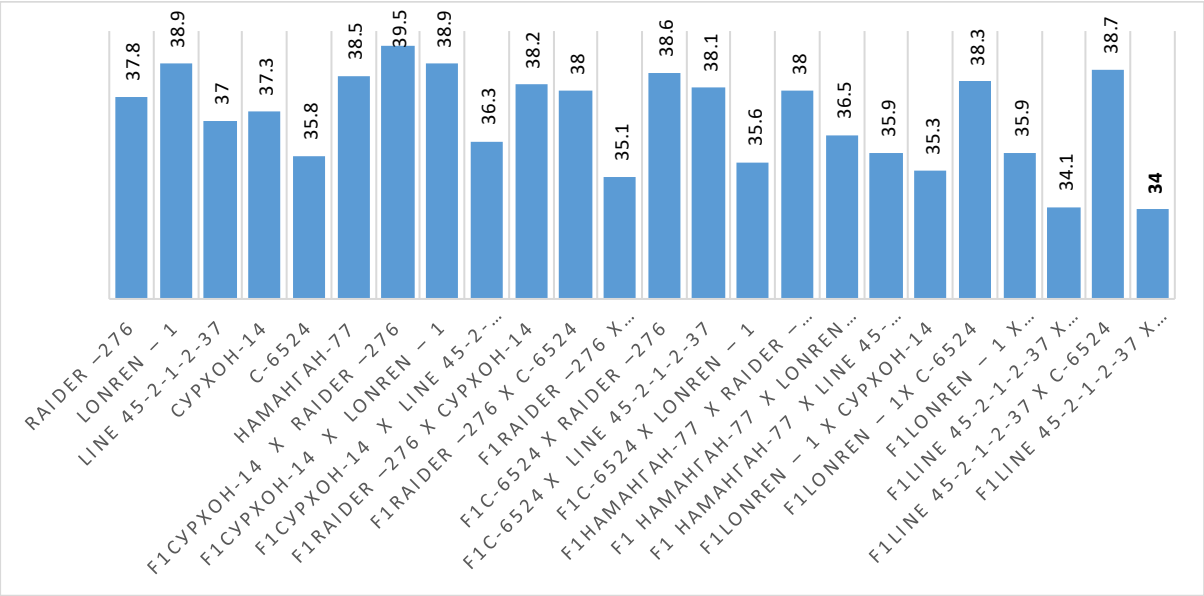

Figure 1. Inheritance of fiber yield in F1 plants 2021

D.A. Musaev [79; p. 98-112] studied fiber output in complex hybrids and recognized its independent formation, independent of other signs.

The heredity of fiber output has been studied by many scientists at different times. A.A.Avtonomov [214; p. 25], M.Polatov, R.G.Kim [100; p. 54], P.Sh.Ibragimov [205; p. 42] are among them.

Table 1 .Variability of fiber yield in F2 plants, 2022.

Parental and hybrid patterns	n	K =2,0, %								M ± m	S	V,%
		29,1-31,0	31,1-33,0	33,1-35,0	35,1-37,0	37,1-39,0	39,1-41,0	41,1-43,0	43,1-45,0			
Raider-276	32	2	4	5	20	1				36,1±0,9	1,2	4,6
Lonren-1	29			4	20	1	1	4		37,6±2,3	0,9	6,8
Line-45-2-1-2-37	45		23	7	5	10				36,0±2,4	3,0	7,6
Сурхон-14	36		10	2	18	3	3			37,7±2,3	1,0	8,9
C-6524	34	4	2	3	22	3				35,9±0,9	1,2	6,2
Наманган-77	33		5	10	8	2	5	3		37,3±2,9	1,6	6,8
F_2Сурхон-14 x Raider-276	35	2	5	2	8	10	5	3		35,3±1,4	2,2	7,2
F_2Сурхон-14 x Lonren-1	35			22	2	8	3			34,5±1,6	2,0	6,0
F_2Сурхон-14 x Line-45-2-1-2-37	45	1	1	20	10	5	5	3		33,9±0,6	3,1	6,6
F_2Raider-276 x Сурхон-14	52		5	10	20	10	4	3		37,9±1,0	2,8	6,2
F_2Raider-276 x C-6524	39		24	8	5	2				32,3±1,6	2,8	5,4
F_2Raider-276 x Наманган-77	36	3		20	8	3	2			33,2±3,0	2,7	4,6
F_2C-6524 x Raider-276	30			20	5	3	2			34,5±1,6	3,2	6,8
F_2C-6524 x Line-45-2-1-2-37	31		13	5	10	3				35,1±0,9	0,9	7,6
F_2C-6524 x Lonren-1	34			20	4	4	2	4		33,6±2,3	3,0	8,9
F_2Наманган-77 x Raider-276	45		22	4	4	5	2	8		32,0±2,4	1,1	6,2
F_2Наманган-77 x Lonren-1	52	8	25	2	10	5		2		33,5±2,3	3,7	6,8
F_2Наманган-77 x Line-45-2-1-2-37	39	2	20	4	6	3	4			32,9±1,7	2,7	7,2
F_2Lonren-1 x Сурхон-14	32		1	3	22	5	1			37,3±2,9	4,3	6,0
F_2Lonren-1x C-6524	46		5	10	15	8	2	3	3	35,3±1,4	3,0	6,6

F_2Lonren-1 x Наманган-77		43	5	2	10	18	5	3			35,9±0,8	3,1	6,2
F_2Line-45-2-1-2-37 x Сурхон-14		36		3	3	10	18	2			37,1±1,0	2,8	5,4
F_2Line-45-2-1-2-37 x С-6524		30		5	5	10	8	2			35,7±1,6	2,8	5,8
F_2Line-45-2-1-2-37 x Наманган-77		33		22		10		1			32,0±0,9	2,7	5,9

Cotton is a technical crop, and the cotton obtained from it is a valuable raw material for industry. More than 100 different types of industrial products are produced from cotton fiber. Cotton fiber is widely used in the textile, paper, chemical, furniture, and machinery industries. Fiber yield depends on the weight of the seed, the absolute weight of the fiber in the seed, the number of fibers in the seed, the quality of the fiber and its index.

Table 2 Fiber yield indicators in F3-F4 plants (2023)

№	Parental and hybrid patterns	Successful plants, %		
		M±m	Σ	V, %
1.	Raider-276	38,8±0,84	0,7	2,9
2.	Lonren-1	37,9±1,44	0,6	2,1
3.	Line-45-2-1-2-37	37,0±1,54	0,9	3,2
4.	Сурхон-14	39,4±1,30	0,3	1,4
5.	С-6524	36,9±0,79	0,5	6,8
6.	Наманган-77	36,5±1,67	0,3	4,5
F_3 plants				
7.	F_3Сурхон-14 x Raider-276	35,9±0,62	1,0	5,5
8.	F_3Сурхон-14 x Lonren-1	36,9±1,04	1,3	9,0
9.	F_3Сурхон-14 x Line-45-2-1-2-37	41,3±1,61	1,1	2,4
10.	F_3Raider-276 x Сурхон-14	39,2±3,02	1,6	4,3
11.	F_3Raider-276 x С-6524	35,0±0,93	1,9	3,4
12.	F_3Raider-276 x Наманган-77	34,1±1,96	1,2	3,2
13.	F_3С-6524 x Raider-276	39,6±1,88	1,0	5,0
14.	F_3С-6524 x Line-45-2-1-2-37	34,1±0,92	1,9	3,5
15.	F_3С-6524 x Lonren-1	34,6±2,39	1,6	2,9
16.	F_3Наманган-77 x Raider-276	34,0±2,40	1,6	2,3
17.	F_3 Наманган-77 x Lonren-1	38,5±2,30	1,3	1,9
18.	F_3 Наманган-77 x Line-45-2-1-2-37	39,9±1,75	1,5	1,9
19.	F_3Lonren-1 x Сурхон-14	39,3±2,99	1,5	2,8
20.	F_3Lonren-1x С-6524	35,3±1,45	1,6	1,7
21.	F_3Lonren-1 x Наманган-77	37,9±0,86	1,7	7,2
22.	F_3Line-45-2-1-2-37 x Сурхон-14	36,1±1,00	1,2	8,8

It is known that cotton is mainly grown for fiber. Therefore, in the selection process, attention is paid to the fiber output of the initial samples involved in the crossbreeding. According to the effective results of the research carried out by the scientists of our republic, the fiber yield of most of the cultivated varieties is high (35-38%). However, most varieties are limited in their fiber output, and our scientists are tasked with creating varieties with a higher fiber index. For this reason, special attention was paid to studying the fiber output of the middle-aged families participating in our experiment.

It is known that today's demand is to create products with a fiber content of not less than 38%. Accordingly, we focused on isolating families with high fiber output. The data obtained in 2010 showed that the indicators of samples and varieties participating as parents ranged from 35.8% (S-6524) to 38.9% (Lonren-1).

Among the isolated F1 plants, the highest fiber yield was observed in the combination of F1Surkhon-14 x Raider-276 and was equal to 39.5%. F1Surkhon-14 x Lonren-1, F1Raider-276 x Surkhon-14, F1Raider-276 x S- 6524,F1S-6524 x Raider-276,F1S-6524 x Line-45-2-1-2-37, F1Namangan-77 x Raider-276,F1Lonren-1x S-6524,F1Line-45-2-1-2- A fiber yield of not less than 38% was recorded in 37 x S-6524 combinations.

Also, plants appeared in the range of 43.1-45% of classes. Inheritance of fiber yield in F1 plants was as follows: extreme dominance in the combination of F1 Surkhon-14 x Raider-276 (hp=7.8),

F1S-6524 x Line-45-2-1-2-37 (hp=2.8), F1Raider-276 x Surkhan-14 (hp=2.6), F1Raider-276 x S-6524 (hp=1, 1), F1Surkhan-14 x Lonren 1 (hp=1.0) dominance, F1Lonren-1x S-6524 (hp=0.7) intermediate inheritance was observed.

In the remaining combinations, complete and intermediate heredity of negative level was noted.

The variability of fiber output in F2 plants was reported, and the result was recorded from 35.9% (S-6524) to 37.7% (Surkhan-14) in parental forms.

It was shown that the fiber yield in F2 plants was from 32.0% (F2Namangan-77 x Raider-276 and F2Line-45-2-1-2-37 x Namangan-77) to 37.9% (F2Raider-276 x Surkhan-14). it happened. Variation was evident in F2 plants and fiber yield was different, i.e. plants with 32%, 33%, 35% fiber yield were shown. Observed to be (F2Lonren-1x S-6524).

Summarizing the results of the scientific research, the highest fiber yield in F3-F4 plants was observed in the Surkhan-14 variety, 39.4%, and in the Raider-276 sample, 38.8% (see Table 3.13). Among the F3 plants, 41, Combinations with 3% (F3Surkhon-14 x Line-45-2-1-2-37) fiber output were separated.

Continued from table 2

Fiber yield indicators in F3-F4 plants (2023)

F_4 plants				
23.	F_4Сурхон-14 x Raider-276	35,7±1,60	1,1	1,1
24.	F_4Сурхон-14 x Lonren-1	39,0±0,93	1,9	2,4
25.	F_4Сурхон-14 x Line-45-2-1-2-37	39,1±1,96	1,2	1,2
26.	F_4Raider-276 x Сурхон-14	39,6±1,88	1,0	1,0
27.	F_4Raider-276 x C-6524	34,1±0,92	1,9	2,5
28.	F_4Raider-276 x Наманган-77	34,6±2,39	1,6	2,9
29.	F_4C-6524 x Raider-276	34,0±2,40	1,6	2,3
30.	F_4C-6524 x Line-45-2-1-2-37	38,5±2,30	1,3	2,9
31.	F_4C-6524 x Lonren-1	37,9±1,75	1,5	2,9
32.	F_4Наманган-77 x Raider-276	35,3±2,99	1,5	2,8
33.	F_4 Наманган-77 x Lonren-1	39,3±1,45	1,6	2,7
34.	F_4 Наманган-77 x Line-45-2-1-2-37	37,9±0,86	1,7	2,2
35.	F_4Lonren-1 x Сурхон-14	39,1±1,00	1,2	2,8
36.	F_4Lonren-1x C-6524	35,7±1,60	1,1	2,1
37.	F_4Lonren-1 x Наманган-77	36,9±0,79	1,5	3,8
38.	F_4Line-45-2-1-2-37 x Сурхон-14	39,4±1,30	1,1	2,4

F3Raider-276 x Surkhon-14, F3S-6524 x Raider-276, F3 Namangan-77 x Line- 45-2-1-2-37, F3Lonren-1 x Surkhan-14 combinations also observed a fiber yield of not less than 39%.In F4 plants, combinations with the participation of Surkhan-14 variety were also distinguished by combinations higher than 39%. Therefore, it was considered appropriate to use the Surkhan-14 variety as a parental form in crossbreeding to increase fiber output.

BIBLIOGRAPHY

1. Topvoldiev.T., Rakhmanov.Z. Correlation of early maturity traits in G2 plants of cotton. Proceedings of the international scientific conference entitled "Evolutionary and selective aspects of early ripening and adaptability in cotton and other agricultural plants". Tashkent, 2005. - 78-79 B.
2. Straumal.B.P. Mezhsortovye skreshchivaniya khlopchatnika. //Khlopkovodstva. 1952g. No. 4. -S. 34-39.
3. Straumal.B.P. Sorta klopchatnika s basis selection. -Tashkent, 1974. S. 214.
4. Simongulyan.N., Ibragimov.P. Nasledovanie kachestva i vykhoda volokna // J.: Khlopkovodstvo. - Tashkent, 1985. - No. 10. -S. 22-24.
5. Rumi.V.A., Skokova.A.A., Asriyan.N.S., Bekbulatova.D.L. O razvitii generativnoy sfery u vnutri– i mejvidovogo hibrida dikix vidov hlopchatnika // Uzb. biol. magazine. -Tashkent, 1978. -No. 2.-S.74-77.
6. Mamarakhimov.B.I., Kholikova.M.I., Kholmurodov.A.I., Saydaliev.Kh. Inheritance of fiber yield in interspecific hybrids with G. tomentosim. // Collection of issues of foza genetics, selection, breeding and breeding. - Tashkent. 2000. -B.67-71.
7. Ibragimov.P.Sh. Rol sistemnykh skreshchivaniy v optimizatsii selektsionnogo protesse khlopchatnika vidov G. barbadense L. i G. hirsutum L.: Autoref. diss. ... Dr. s.-x. Nauk.–Tashkent, 2003.-42 p.
8. Mamarakhimov.B.I., Kholikova.M.I., Kholmurodov.A.I., Saydaliev.Kh. Inheritance of fiber yield in interspecific hybrids with G. tomentosim. // Collection of issues of foza genetics, selection, breeding and breeding. - Tashkent. 2000. -B.67-71.
9. Musaev.D.A. Genetic collection khlopchatnika. -Tashkent: Science. - 1979. - S. 98-112.