INHERITANCE AND VARIABILITY OF FIBER YIELD IN F1–F2 HYBRIDS OBTAINED FROM MEDIUM FIBER COTTON CULTIVARS

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Аннотация. В статье представлены результаты исследований наследственности и изменчивости выхода волокна у гибридов F_1-F_2 от средневолокнистых сортов хлопчатника.

Annotation. The article presents the results of studies of heredity and variability of fiber yield in F_1-F_2 hybrids from medium fiber cotton varieties.

Ключевые слова: хлопчатник, гибрид, выход волокна, донор, наследственность, изменчивость, доминант, морфологический, биологический, положительный гетерозис, отрицательный гетерозис.

Key words: Cotton, hybrid, fiber yield, donor, heredity, variability, dominant, morphological, biological, positive heterosis, negative heterosis.

In order to create cotton varieties that meet modern requirements, there must be diverse and well-studied initial sources (donors). The varieties created and put into practice in recent years are characterized by positive morpho-biological characteristics and technological quality indicators. Effective and correct use of the cotton gene pool, i.e. samples of wild, semi-wild forms and varieties available in it, is important for the creation of such varieties.

It has been noted that wide transgressive variation in fiber length and fiber output occurs in F2-F3 hybrids obtained from interspecies crossings, and the possibility of selecting recombinants with a positive set of these characters can increase [1]. "It is known that there are more than 100 cotton-growing countries in the world" [7], Australia (2.3 t./ha), Brazil (1.6 t./ha) and China (1.72 t.) /ha), and in Uzbekistan, fiber yield is 0.75 t./ha [8]. It has been proven in the experiment that

the amount and length of the fiber has a positive effect on the weight of cotton in 1 sack of cotton varieties. A negative or positive association between traits was found to be mostly related to one of the traits involved [2].

It is known that cotton, which is adapted to different soil and climate conditions of the Republic, has high morphological, biological, technological and quality indicators, and differs sharply from each other in terms of resistance to drought and diseases and insects, is produced by research institutes engaged in breeding and a number of scientific institutions. varieties are created and submitted to the state variety testing centers for testing in comparison with the main varieties grown in these regions. However, new cotton varieties presented for testing can have plastic properties under different soil-climatic conditions if they incorporate in their genotypes yield, early maturing, high fiber yield and quality, and disease and pest tolerance. Otherwise, it is inevitable that the indicators shown in the soil-climate conditions of one region will be lower in the soil-climate conditions of other regions. In this regard, one of the important tasks for cotton farms today is the introduction of quick-ripening, productive, high-quality fiber content per hectare, and incorporating stable biotypes in terms of morpho-biological and valuable economic characteristics, which ripen in September. Taking into account the above ideas, we have involved the medium-fiber cotton varieties widely distributed today as parental forms in our research.

Table 1

№	Combination	M±m	σ	V%	hp	M±m	σ	V%
		F_1 hybrids (2019)				F_2 hybrids (2020)		
1	С-6524 (андоза)	37,7±0,58	1,56	4,13		36,6±0,47	1,14	3,13
2	Андижон-36	38,6±0,36	0,96	2,50		38,0±0,66	0,97	2,55
3	Султон	37,8±0,60	1,61	4,26		37,0±0,69	1,64	4,43
4	Андижон-37	38,4±0,65	1,74	4,52		37,5±0,73	1,73	4,62
5	Жаркўрғон	37,8±0,51	1,35	3,57		36,5±0,31	1,65	4,52
6	ЎзПИТИ-201	35,9±0,55	1,48	4,13		34,9±0,61	0,71	2,03
7	Омад	37,5±0,6	1,74	4,64		36,5±0,62	1,44	3,94

		5						
8	Наманган-77	38,2±0,54	1,44	3,77		37,4±0,45	1,37	3,67
9	Турон	37,5±0,62	1,65	4,38		37,0±0,65	1,23	3,34
10	Келажак	38,5±0,51	1,35	3,52		37,2±0,52	1,64	4,42
11	Наманган-34	37,9±0,83	2,20	5,80		37,6±0,63	2,54	6,75
12	Бухоро-102	38,4±0,75	1,99	5,16		38,0±0,42	1,94	5,11
13	Андижон-36 хАндижон-37	38,4±0,38	1,22	3,18	-1,00	40,0±0,47	1,52	3,79
14	Андижон-36 хС-6524	36,3±0,61	1,94	5,34	-4,10	40,1±0,33	1,07	2,68
15	Андижон-36 хНаманган-34	37,8±0,67	2,12	5,61	-1,28	40,2±0,39	1,25	3,11
16	Андижон-36 хНаманган-77	38,4±0,48	1,55	4,03	-3,33	42,0±0,64	2,03	4,83
17	Андижон-36 хОмад	35,9±0,70	2,22	6,18	-3,90	37,8±0,43	1,39	3,67
18	Андижон-36 хСултон	37,3±0,42	1,36	3,65	-2,25	40,0±0,49	1,55	3,89
19	Андижон-36 хЖарўрғон	36,5±0,85	2,70	7,38	-4,25	40,3±0,78	2,47	6,12
20	Андижон-36 хКелажак	38,4±0,75	2,39	6,22	-3,00	40,0±0,42	1,35	3,37
21	Андижон-36 хБухоро-102	38,3±0,84	2,67	6,95	-2,00	36,2±0,73	2,33	6,43
22	Андижон-36 хТурон	37,5±0,76	2,43	6,48	-1,00	38,9±1,12	3,55	9,11
23	Андижон-36 хЎзПИТИ-201	36,4±0,46	1,46	4,01	-0,63	38,5±0,91	2,89	7,51
24	Султон хАндижон-37	38,2±0,51	1,62	4,24	0,33	36,3±1,14	3,61	9,94
25	Султон хС-6524	37,3±0,38	1,21	3,24	-9,00	39,4±0,45	1,44	3,65
26	Султон хНаманган-34	36,8±0,32	1,02	2,76	-21,0	40,0±0,53	1,70	4,25
27	Султон х Наманган-77	37,2±0,39	1,25	3,36	-4,00	38,6±0,66	2,10	5,42
28	Султон хОмад	37,3±0,54	1,74	4,66	-2,33	34,7±0,89	2,84	8,16
29	Султон хТурон	37,1±0,53	1,70	4,57	-0,70	34,7±1,02	3,24	9,32
30	Султон хЖаркўрғон	37,6±0,46	1,46	3,89	-9,00	32,5±0,70	2,22	6,81
31	Султон хЎзПИТИ-201	36,2±0,60	1,92	5,30	0,68	38,5±0,76	2,43	6,29
32	Султон хКелажак	38,2±0,53	1,69	4,42	0,14	39,2±0,86	2,73	6,96

33	Султон хБухоро-102	38,0±0,69	2,19	5,74	0,33	38,1±0,59	1,88	4,92
34	Султон х Андижон-36	38,4±0,38	1,22	3,18	0,50	39,4±0,75	2,39	6,06

Table 1

Fiber yield indicators of F1-F2 hybrids obtained as a result of crossing

In particular, in our 2019 research, we can see that the fiber yield of varieties participating as parental forms was on average from 35.9% (UzPITI-201) to 38.6% (Andijan-36). Most of the cultivars showed superiority over the template when compared to the S-6524 (37.7%) cotton cultivar, which was involved in our research as a model cultivar. Only Turon, Omad (37.5%) and UzPITI-201 (35.9%) varieties showed low results compared to the standard. Studies on the heredity and variability of fiber yield were also conducted in F1 hybrids obtained from crossing these varieties.

According to the research results, the average fiber yield in F1 hybrids is from 36.2% (F1Sultan x UzPITI-201) to 38.4% (F1Sultan x Andijon-36, F1Andijon-36 x Kelajak, F1Andijon-36 x Namangan-77, F1Andijon-36 x Andijan-37) we can see. It is known from the literature that G. Mendel's first law is the law of dominance, in which the hybrids of the first generation embody relatively dominant, i.e. superior, traits of the parents. In our research, we also analyzed the dominance index (hp) in F1 hybrids. According to the research results, we can see that there was positive heterosis in the F1Sultan x Andijan-37, F1Sultan x UzPITI-201, F1Sultan x Kelajak, F1Sultan x Bukhara-102, F1Sultan x Andijan-36 hybrids, and the negative heterosis in the rest of the hybrids was reflected in our research Table 1 .

According to the research analysis carried out in 2020, we can see that the variability of fiber output in parent forms was on average from 34.9% (UzPITI-201) to 38.0% (Andijan-36, Bukhara-102). When parentage patterns were compared with cotton variety S-6524 (36.6%), most varieties showed superiority over the template. Only varieties Zharkurgan, Omad (36.5%) and UzPITI-201 (34.9%) showed low results compared to the standard.

Studies on heredity and variability of fiber yield were also conducted in F2 hybrids obtained from crossing these varieties. According to the research results, we can see that the average fiber yield in F2 hybrids is from 32.5% (Sultan x Jarkurgan) to 42.0% (Andijan-36 x Namangan-77). When the F2 hybrids were studied in comparison with the parental forms, some hybrids showed lower performance compared to the parental forms. In particular, F2Andijan-36 x Bukhara-102 36.2% of parental forms, and in turn Andijan-36 38.0% and Bukhara-102 38.0%, fiber yield in F2Sultan x Andijan-37 hybrid is 36.3%. -parental forms are Sultan (37.0%) and Andijan-37 (37.5%), F2Sultan x Omad 34.7%, and parental forms are Sultan (37.0%) and Omad 36.5 %, F2Sultan x Turon 34.7% parental forms are respectively Sultan (37.0%) and Turon 37.0%, F2Sultan x Jarkorgon 32.5% parental forms are respectively Sultan (37.0%) and Jarkorgon had low indicators compared to the parent forms, making 36.5%. In addition, all the remaining hybrids obtained superior results compared to the parental forms. Among the hybrids, F2Sultan x Namangan-34, F2Andijan-36 x Kelajak, F2Andijan-36 x Jaro'rgan, F2Andijan-36 x Sultan, F2Andijan-36 x Namangan-77, F2Andijan-36 x Namangan-34, F2Andijan-36 x S-6524 and F2 Andijon-36 x Andijon-37 hybrids showed a result higher than 40.0% in terms of fiber output and stood out from other hybrids.

In conclusion, we can say that F1 hybrids F1 Sultan x Andijan-37, F1Sultan x UzPITI-201, F1Sultan x Kelajak, F1Sultan x Bukhara-102, F1Sultan x Andijan-36 have positive heterosis.

In F2 hybrids, F2Sultan x Namangan-34, F2Andijan-36 x Kelajak, F2Andijan-36 x Jarorgon, F2Andijan-36 x Sultan, F2Andijan-36 x Namangan-77, F2Andijan-36 x Namangan-34 with a result of more than 40.0% in F2 hybrids , F2Andijon-36 x S-6524 and F2Andijon-36 x Andijon-37 recombinants were isolated and recommended for further research.

Studies have shown that the heritability of fiber output can be heritable and variable depending on parental genotype as well as external environmental factors.

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