Development of Economic Traits in Backcross Hybrids of Cotton Genetic Collection Lines

Khayitova Shakhlo Davlatovna

Termiz State Pedagogical Institute
xayitova2016@mail.ru

ABSTRACT

In the article, the research conducted in the lines of the cotton genetic collection of the National University of Uzbekistan is of particular importance. Development of economic traits in the cross-hybrids of the cotton genetic collection of the National University of Uzbekistan was determined experimentally.

Keywords: backcross hybrids, genetic collection, line, isogenic, introgressive, fiber index, combination.

Introduction. The cultivation of raw cotton in Jakhan has grown by 7.2% in recent years, reaching 24,3 million tons and occupying an area of 30 million hectares. China, USA, Pakistan, India and Uzbekistan take the leading place among cotton producers. These five countries produce 65 percent of the world's cotton.

For this reason, in selection, in improving the variety of self-pollinated and cross-pollinated plants, enriching the hybrid generation with the necessary characteristics of the father or mother copies, backcross hybridization is carried out. Backcross — recrossing of hybrids with one of the parent copies, backcross to plant selection N.V.Harland and M.N.Pope Introduced by (1922).

Therefore, it is important to study the heritability of fiber yield and fiber length traits, which are the main components of cotton productivity and fiber quality, in the lines of the cotton genetic collection, which are a valuable gene source and in the hybrids of different generations obtained from their crossing.

Therefore, we are conducting research on the inheritance and expression of fiber length and fiber yield characteristics in hybrid generations of cotton genetic collection lines, especially in backcross hybrids.

G.*hirsutum.*L. of cotton created under the leadership of Academician J.A.Musaev at the National University of Uzbekistan as a starting material for studying the heredity of fiber length and fiber output. The parental lines L-620, L-4112, which are part of the genetic collection belonging to the type, have large seeds and pods, high fiber index and yield and fully hairy seeds.

The obtained results were studied statistically and the average arithmetic value (X), the average arithmetic error (m) and the amount of variation (v) were determined.

The main goal of our research is to study the inheritance and manifestation of fiber length and fiber yield traits in hybrid generations of cotton genetic collection lines, especially in backcross hybrids.

The main goal of our research was to study the inheritance of the fiber length trait in cotton introgressive interlineal hybrids. Introgressive lines from the genetic collection of G.*hirsutum* L. were used as the object of our research. The first, second and backcross - hybrid generations obtained from crossing in

line combinations 620 and L-4112 were studied.

In our research, the fiber length indicators in the combination of lines L-620 and L-4112 in the starting parents, that is, the fiber length of the L-4112 line was 36.5 mm and the fiber length of the L-620 line was 34.5 mm, the standard deviation was 2.21; 1.77 respectively, the coefficient of variation was 6.41% and 4.85% respectively. In the first F_1 generation, the mean fiber length was 36.9 mm, the hp dominance index was 1.4, the standard deviation was 1.81 and the coefficient of variation was 5.21%.

In the hybrids of the second F_2 L-620 x L-4112 generation, the average fiber length was 36.9 mm, the standard deviation was 1.61 and the coefficient of variation was 4.36%.

F_B backcross - fiber length 36.9 mm in F_B (L-620x 4112)xL-620 hybrids with L-620 line, as well as fiber in F_B (L-620 x 4112) x L-4112 hybrids with L-4112 line length was 37.7 mm, standard deviation was 1.28;1.73, coefficient of variation was 3.47% and 4.58% respectively.

Therefore, the combination of L-4112 and L-620 lines in the F_1 generation showed fiber length in the positive superdominance type, that is, positive heterosis occurred in the first generation hybrids and in the second F_2 generation and F_B backcross hybrids, fiber length showed an average index higher than the initial forms

Indicators of parental forms, first, second and backcross hybrids by fiber length
(Table 1)

Lines	Fiber length	S	V%	hp
L-4112	36,5	1,77	4,85	
L-620	34,5	2,21	6,41	
F_1L-620x4112	36,9	1.81	5,21	1,4
F_2L-620x4112	36,9	1,61	4,36	
F_B(L-620x4112)xL-620	36,9	1,28	3,47	
F_B(L-620 x 4112)xL- 4112	37,7	1,73	4,58.	

This indicates that there is a positive transgression in terms of fiber length (Table 1). Indicators of parental forms, first, second and backcross hybrids by fiber length (Table 1)

Also, if we focus on the heritability of the fiber output character of these lines, in the combination of L-620 and L-4112 lines, in the initial parents, that is, the fiber output of the L-620 line was 35.4% and the fiber output of the L-4112 line was equal to 35%, standard deviation 2,48; 2.55, the coefficient of variation was equal to 7.01% and 7.29% respectively.

The average fiber yield in the first F_1 generation was 34.7%, hp dominance index = -2.44, standard deviation 1.19, coefficient of variation was 3.42%.

In the second F_2 L-620 x L-4112 generation hybrids, the average fiber yield was 36.4%, standard deviation 2.50, coefficient of variation 6.87%, F_B (L-620 x 4112) x L with L-620 line - 620 beckross hybrids have a fiber yield of 38.8% and F_B (L-620 x 4112) x L-4112 beckross hybrids with L-4112 line have a fiber yield of 39.1%, standard deviation is 2.83; 3.11, the coefficient of variation was 7.29% and 7.96%.

Therefore, the combination of lines L-620 and L-4112 in the F_1 generation was inherited in the negative superdominance type, that is, negative heterosis occurred in the hybrids of the first generation.

Fiber yield in the second F_2 generation and FB backcross hybrids showed an average value higher than that of the initial forms.

2- жадвал

Lines	Fiber output	S	V%	hp
L-4112	35	2,55	7,29	
L-620	35,4	2,48	7,01	
F_1L-620x4112	34,7	1.19	3.42	-2,44
F_2L-620x4112	36,4	2,50	6,87	
F_B(L-620x4112)xL-620	38,9	2,83	7,29	
F_B(L-620 x 4112)xL- 4112	39,1	3,11	7,96	

This indicates that a positive transgression event has occurred according to the sign of fiber output (Table 2). Indicators of parental forms, first, second and backcross hybrids in terms of fiber output (Table 2) If we look at the lines of variation in fiber length in our research, the average index of fiber length of L-620 line is 34.7mm, it is located in 4 classes in the range of 31-37mm and the indicators have shifted to the right (Table 3).

The average fiber length of L-4112 line is 36.5 mm, there are 5 classes in the range of 31-39 mm and the indicators are shifted to the right.

In the first generation F_1L-620xL-4112 hybrids, the average index of fiber length was 36.9 mm, 33-39 mm in the range of 4 classes, and their indicators shifted to the right. In the second generation F_2 L-620x L-4112 hybrids, the average indicator of fiber length was 36.7 mm, located in 5 classes in the range of 31-39 mm, the indicators shifted to the right. At the same time, in backcross hybrids recrossed to L-620 and L-4112 lines, the average indicator of fiber length is 37.4 mm, 38.1 mm, respectively, they are located in the range of 5 classes in the range of 31-39 mm and it is known that the shift of indicators deviates to the right. was (Table 3).

Table 3
Variation of fiber length

Materials	Hair type	n	Class averages					X±m	σ	V
			31	33	35	37	39			
L-620	OC	71	8	39	14	10		34,7±0,20	1,73	4,99
L-4112	OC	55	2	6	26	17	4	36,6±0,24	1,78	4,87
F_1L-620xL-4112	OC	24		2	11	9	2	36,9±0,32	1,55	4,22
F_2L-620xL-4112	OC	36	1	4	13	16	2	36,8±0,29	1,74	4,74
$F_в$(L-620xL-4112) x L-620	OC	84		3	25	50	6	37,4±0,14	1,31	3,49
$F_в$(L-620xL-4112) x L-4112	OC	91	1	3	14	41	30	38,2±0,18	1,71	4,49

As can be seen from Table 3, compared to the initial parent L-620 and L-4112 lines, the fiber length of the first, second generation and backcross-hybrids, similar to their parents, shifted positively to the right. In the analysis of variation of fiber output of our research, the average fiber output of L-620 line is 35.2%, 31-39% in the range of 5 classes. The average fiber yield of the L-4112 line was 34.9%, with a range of 31-41% on a scale of 6 classes (Table 4). The first generation of these lines

(Table 4)
Variational variability of fiber output.

Materials	Hair type	n	Class averages								X±m	σ	V
			31	33	35	37	39	41	43	45			
L-620	OC	71		6	15	24	10	10	2	4	38,7±0,36	3,04	7,86
L-4112	OC	55	3	10	15	14	10	3			35,0±0,34	2,57	7,37
F_1L-620xL-4112	OC	24	5	9	9	1					34,8±0,34	1,69	4,87
F_2L-620xL-4112	OC	36	6	8	11	7	4				36,4±0,41	2,49	6,83
$F_в$(L-620xL-4112) x L-620	OC	84		8	14	24	21	12	2	3	38,8±0,31	2,84	7,34
$F_в$(L-620xL-4112) x L-4112	OC	91		8	17	23	18	16	7	1	39,0±32	3,06	7,84

In L-620 x L-4112 and second generation F_2 L-620 x L-4112 hybrids, the average index of fiber yield is 34.8%, 36.4%, respectively and is located in 5 classes in the range of 31-39%, the deviation of indicators is to the left moved to the side. Also, the average indicator of fiber yield in the backcross hybrids was 38.7% and 39%, respectively, in the range of 33-45% on the scale of 7 classes and the indicators shifted to the left.

Table 4 shows that in the first- and second-generation hybrids of the L-620 and L-4112 lines, the variation variability indicators shifted to the left, but in the backcross hybrids, the variation variability indicators were on the right, i.e. positive side. This makes it possible to select recombinant plants with high fiber output in their cross-hybrids.

In conclusion, according to the analysis of fiber length trait inheritance in F_1, F_2 and F_B hybrids obtained from crossing lines of cotton genetic collection, as well as the analysis of its dominance level in F_1 hybrids, fiber length was inherited in intermediate and positive extreme dominance types in the F_1 generation depending on the combination. In the second F_2 generation and F_B backcross hybrids of L-4112 and L-620-line combinations, the average fiber length was higher than the initial forms.

This indicates that there is a positive transgression in terms of fiber length. According to the analysis of the inheritance of the fiber yield sign in F_1, F_2 and F_B hybrids obtained from the crossing of cotton genetic collection lines, as well as the analysis of its dominance level in F_1 hybrids, fiber yield combinations were inherited in the F_1 generation in the negative super dominance type, that is, negative heterosis occurred in the first-generation hybrids.

Fiber yield in the second F_2 generation and F_B backcross hybrids showed an average value higher than that of the initial forms. This indicates that a positive transgression event has occurred according to the sign of fiber output. The backcross hybrids of these L-4112 and L-620 lines have a higher proportion of recombinant plants with higher fiber length and fiber elongation traits than the parent, first- and second-generation hybrids. This makes it possible to select recombinant plants with high fiber yield and fiber length in backcross hybrids.

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