

INHERITANCE OF VALUABLE ECONOMIC CHARACTERS IN F1 PLANTS OBTAINED AS A RESULT OF CROSSING THE THIN FIBER VARIETY OF COTTON AND THE LARGE BORE LINES

B. K. Madartov,
F. R. Abdiev,
N. A. Narimanova,
N. U. Mavlonova

Samarkand State Veterinary Medicine, Animal Husbandry and
Biotechnology University, Tashkent Branch

Abstract

In this paper, the inheritance of valuable economic traits in F1 plants obtained from cross-breeding of fine fiber cotton and large boll lines was analyzed. In the conducted researches, it was observed that the dominance coefficient of cotton was inherited in a positive intermediate, negative intermediate, dominant and extremely dominant state. In order to maintain a positive state of heterosis in the F1 plants obtained as a result of hybridization, it is necessary to continue genetic-selection scientific research in the next generations.

Keywords: cultivar, line, crossbreeding, progeny, valuable economic traits, cotton boll weight, fiber length, fiber yield, dominance level, superdominant, dominant, intermediate inheritance.

Introduction

As a result of the global climate change in the southern regions of our region, as a result of the negative effects of factors such as high temperature, hot wind flow-harmsel and alfalfa kandal, the yield elements of medium-fiber cotton varieties are seriously damaged. According to their biological characteristics, fine-fiber varieties of cotton are very demanding to high heat temperatures, so they are grown and harvested in small areas in the southern regions. Establishing the cultivation of fine fiber cotton in the country will greatly benefit the national economy. In order to put it on the way, the creation of fast-ripening, fiber-quality and high-yield varieties of *G. barbadense* L. cotton varieties and the expansion of cultivated areas play an important role [4].

From the high generation of backcross hybrid populations (F₈-F₁₀) obtained by crossing the geographically distant 010972 sample of *G. barbadense* L. with the T-817 strain of fine fiber cotton (♀T-817 x ♂010972) x T-817 The heredity, variability and correlative relationships between isolated plants and plants with large bags (more than 4.2 g) in these joints were studied. It has been proved that strong negative correlations between traits such as fiber yield and fiber length, fiber yield and 1000 seed weight can be changed to a positive one in plants with large pods (over 4.2 g) isolated from high-generation hybrids [1].

B.Kh.Amanov, Z.J. Abdujalilova [2] in the research conducted by, valuable economic traits, including fiber length (40.0-42.0 mm), fiber yield (38.0-40.0), were obtained from the F₇ plant families obtained by cross-breeding thin fiber forms of cotton. isolated the forms embodying the



high indicators of the sum of characters and showed the prospect of using them in further practical selection research.

J.H. Akhmedov, Kh.Chorieva [3] noted that in the southern regions of our country, during the period of cotton growth, a sharp rise in temperature, frequent blowing of garmsel, caused the loss of crop elements of the cultivated medium fiber cotton varieties. In addition, information on the valuable economic characteristics of the new thin-fiber cotton varieties Termiz-202, Termiz-208 is provided. It was mentioned that Termiz-202 and Termiz-208 varieties have a high rate of opening of pods.

Many thin-fiber varieties have been created in our country, such as Termiz-7, Termiz-8, Termiz-14, Termiz-15 and Termiz-31. Later thin fiber varieties (S-6029, S-6030, S-6032, S-6037, S-6040, S-6042, Karshi-8, Karshi-9, Surkhan-2, Surkhan-3, Surkhan-5, Surkhan -7, Surkhan-9, Surkhan-14, Surkhan-16, Surkhan-18, Surkhan-100, Surkhan-101, Surkhan-102, Surkhan-103) were created and regionalized in the southern regions. Currently, due to the increased demand for high-quality fiber in the world cotton market, it is most important to create types I-a, I-v, I, II with thin fibers [6]. Sh.Turabekov and others [7], the genetic control of the fiber yield sign in cotton is complicated and they noted that polymer genes are involved in its development.

One of the main disadvantages of fine fiber cotton varieties is their low productivity and late ripening. Taking this into account, in recent years, great progress has been made in the selection of thin fiber cotton based on different methods of hybridization (simple, double, complex). It is known that one of the most important indicators of cotton is the fiber yield, based on the study of heritability and variability, it has been determined that the character depends on the parental genotypes, and it is possible to achieve a large-scale transgression of the fiber yield and quality by hybridizing different species [5].

The results of our scientific research were analyzed on the heredity and variability of valuable economic traits such as cotton weight per boll, fiber length, fiber yield, 1000 seed weight in F₁ plants obtained as a result of cross-breeding cotton with thin fibers and lines.

As an object of research, thin-fiber cotton varieties Surkhan-14, Surkhan-18, Termiz-31, Iloton-14, Angor varieties and large-bore T-2017, T-1985, T-2006, T-2017-2 lines were used, and scientific the following methods were used for research: simple hybridization, mathematical analysis.

Research results

It was found out from the indicators of cotton weight in one boll of the primary sources that G.barbadense L. varieties have medium-sized bolls (3.1-4.8 grams), in the rows selected for research, large bolls according to this sign were 5, It was found to be 0-5.3 grams (Table 1).

Table 1 Inheritance of the trait of cotton weight per boll in parent sources and F₁ plants

№	Primary forms and F ₁ generation Combinations	Weight of cotton in one sack, grams				
		$\bar{x} \pm S\bar{x}$	Limit	S	V %	hp
Primary forms						
1	Термиз-31	3,3±0,09	2,7-3,6	0,29	8,6	-
2	Сурхон-14	3,4±0,07	3,1-3,7	0,21	6,2	-



3	Сурхон-18	3,5±0,08	3,2-3,8	0,26	7,8	-
4	Илотон-14	3,1±0,07	2,7-3,4	0,23	7,4	-
5	Ангор	4,8±0,05	4,6-5,1	0,16	3,4	-
6	Т-1985	5,3±0,10	4,8-5,6	0,31	5,9	-
7	Т-2017	5,2±0,10	4,3-5,4	0,33	6,3	-
8	Т-2017-2	5,0±0,15	4,0-5,4	0,47	9,3	-
9	Т-2006	5,1±0,11	4,2-5,4	0,34	6,6	-
F₁-plants						
1	Т-1985 х Сурхон-14	4,4±0,17	3,3-4,9	0,54	12,2	0,05
2	Сурхон-14 х Ангор	4,2±0,22	3,1-4,9	0,70	16,5	0,14
3	Сурхон-14 х Илотон	3,8±0,13	2,9-4,3	0,40	10,6	3,6
4	Термиз-31 х Ангор	4,2±0,14	3,3-4,6	0,44	10,4	0,20
5	Ангор х Сурхон-14	4,4±0,14	3,4-4,7	0,46	10,3	0,42
6	Т-2017-2 х Илотон	4,5±0,12	3,8-4,9	0,39	8,6	0,47
7	Т-2017 х Сурхон -14	3,9±0,13	3,1-4,4	0,40	10,2	- 0,44
8	Сурхон-18 х Илотон	3,5±0,14	3,0-4,4	0,44	12,5	1,0
9	Ангор х Илотон	4,5±0,16	3,3-4,9	0,49	10,9	0,64
10	Т-2017 х Илотон	4,2±0,11	3,6-4,7	0,34	8,0	0,04
11	Т-2017-2 х Сурхон -14	3,9±0,12	3,1-4,3	0,39	10,0	- 0,37
12	Ангор х Сурхон-18	4,3±0,13	3,3-4,6	0,40	9,30	0,28
13	Т-2006 х Илотон	4,6±0,12	3,8-4,9	0,37	8,5	0,5
14	Сурхон-14 х Т-1985	4,1±0,12	3,6-4,8	0,38	9,2	- 0,26

In the studied F₁-plants, the heredity of the character of cotton weight in one boll was analyzed. In the studied hybrid combinations, the weight of cotton in one bag was 3.5-4.6 grams. The amplitude of variability is high, the coefficient of variation was 8.5-12.5 %, respectively. In particular, in the F₁ T-2006 x Илотон combination, the weight of cotton in one boll is a large boll, i.e. 4.6 grams, in the combination of F₁ T-2006 x Илотон, and this sign is observed with positive intermediate inheritance (hp=0.44), while the weight of cotton in one boll is relatively low. In F₁ Surkhan-18 x Илотон combination, 3.5 grams, dominant trait inheritance (hp=1.0) was found. In the other studied combinations, mainly positive intermediate, dominant and super-dominant heredity was noted for this trait (Table 1).

As a result of the study of the fiber length sign in the *G. barbadense* L. species and varieties, a high index was observed in the T-2017 line (40.7 mm), while in the T-2017-2 line, the fiber length was slightly lower, 39.3 mm. Cotton fiber length was 39.4-40.3 mm in selected varieties (Table 2).



Table 2 Fiber length in initial sources and F₁ plants heredity of the sign

№	Primary forms and F ₁ generation Combinations	Fiber length, days			
		$\bar{x} \pm S\bar{x}$	Limit	V %	hp
Primary forms					
1	Термиз-31	39,4±0,05	37,8-41,0	2,4	-
2	Сурхон-14	40,3±0,04	38,8-41,6	2,0	-
3	Сурхон-18	40,3±0,03	38,9-41,5	1,9	-
4	Илотон-14	39,5±0,03	37,6-40,2	1,7	-
5	Ангор	40,2±0,02	40,0-41,0	1,2	-
6	Т-1985	40,2±0,03	39,6-41,0	1,5	-
7	Т-2017	40,7±0,03	40,0-42,0	1,8	-
8	Т-2017-2	39,3±0,04	38,0-40,0	2,0	-
9	Т-2006	40,3±0,03	40,0-41,0	1,3	-
F₁-plants					
1	Т-1985 х Сурхон-14	40,0±0,07	38,0-42,0	4,1	-5,0
2	Сурхон-14 х Ангор	39,0±0,06	37,0-41,0	3,9	-25,0
3	Сурхон-14 х Илотон	38,8±0,05	37,0-40,0	2,7	-2,7
4	Термиз-31 х Ангор	38,3±0,05	36,8-40,0	2,9	-3,7
5	Ангор х Сурхон-14	38,5±0,03	37,1-40,0	2,5	-35,0
6	Т-2017-2 х Илотон	38,7±0,02	36,0-40,0	2,6	-7,0
7	Т-2017 х Сурхон -14	37,6±0,02	37,0-39,0	2,3	-4,4
8	Сурхон-18 х Илотон	38,0±0,06	36,0-40,0	3,8	-4,7
9	Ангор х Илотон	40,2±0,03	38,0-41,0	2,8	1,0
10	Т-2017 х Илотон	39,2±0,03	38,0-40,0	2,5	-1,5
11	Т-2017-2 х Сурхон -14	40,3±0,02	39,0-41,0	2,0	1,0
12	Ангор х Сурхон-18	38,2±0,08	36,5-40,0	2,7	-41,0
13	Т-2006 х Илотон	39,8±0,03	38,0-41,0	3,1	-0,2
14	Сурхон-14 х Т-1985	38,6±0,03	37,0-40,0	2,9	-33,0

The heritability of the fiber length trait was analyzed in F₁-plants obtained as a result of hybridization. In the studied hybrid combinations, the fiber length was 37.6-40.3 mm. The amplitude of variability is relatively low, the coefficient of variation was 2.0-4.1%, respectively. For example, in the combination of F₁ T-2017-2 x Surkhan-14, the fiber length marker is slightly higher than other combinations, 40.3 mm, and the coefficient of variation is 2.0%, and dominant inheritance for this marker (hp=1.0), fiber length was 37.6 mm in the F₁ T-2017 x Surkhan-14 combination, the coefficient of variation was 2.3%, and the trait was inherited in a negative super-dominant (hp=-4.4) state. In other combinations, mainly negative intermediate, dominant and super-dominant heritability according to fiber length sign was found (Table 2).

As can be seen from the analysis of the research results (Table 2), the fiber yield sign is different



in the selected initial sources, the index is high in the Surkhan-18 variety, that is, this indicator is 37.3%, while the fiber yield sign is in the Surkhan-14 and Iloton varieties. was equal to (34.0 %). Among the ridges selected for the study, it was found that the T-2017 ridge had a relatively low index of fiber output, the result of 34.6%.

Table 3 Inheritance of fiber yield trait in initial sources and F₁ plants

№	Primary forms and F ₁ generation Combinations	Fiber output, %			
		$\bar{x} \pm S\bar{x}$	Limit	V %	hp
Primary forms					
1	Термиз-31	36,5±0,53	32,5-38,4	4,6	-
2	Сурхон-14	34,0±0,03	32,0-36,0	3,6	-
3	Сурхон-18	37,3±0,49	34,2-39,0	4,1	-
4	Илотон-14	34,0±0,37	32,0-35,0	3,0	-
5	Ангор	36,5±0,35	34,5-36,4	3,0	-
6	Т-1985	35,3±1,03	32,0-40,0	9,5	-
7	Т-2017	34,6±0,29	32,4-35,3	2,7	-
8	Т-2017-2	35,9±0,40	33,9-37,2	3,5	-
9	Т-2006	34,8±0,52	33,0-36,1	5,0	-
F₁-plants					
1	Т-1985 x Сурхон-14	36,9±0,68	34,9-40,2	5,8	3,4
2	Сурхон-14 x Ангор	36,4±0,36	34,5-37,6	3,1	0,9
3	Сурхон-14 x Илотон	36,4±0,58	29,5-34,5	5,5	0,0
4	Термиз-31 x Ангор	37,4±0,34	36,2-39,4	2,8	0,0
5	Ангор x Сурхон-14	36,4±0,31	35,2-37,9	2,6	0,9
6	Т-2017-2 x Илотон	30,5±0,51	28,9-32,9	5,2	-4,6
7	Т-2017 x Сурхон -14	35,3±1,20	31,4-40,4	10,7	3,3
8	Сурхон-18 x Илотон	34,2±0,70	31,4-37,5	6,4	-0,8
9	Ангор x Илотон	33,7±0,13	33,2-34,2	1,2	1,2
10	Т-2017 x Илотон	35,5±0,59	33,7-38,0	5,2	4,0
11	Т-2017-2 x Сурхон -14	36,8±0,92	31,2-38,1	8,4	1,9
12	Ангор x Сурхон-18	35,3±0,57	34,1-38,2	5,0	0,04
13	Т-2006 x Илотон	34,3±0,28	33,1-35,2	2,5	-0,25
14	Сурхон-14 x Т-1985	32,5±0,96	29,6-37,6	9,1	3,3

In all F₁-plants studied in our research, the method of inheritance of the fiber yield trait was comparatively studied. The results of the study showed that F₁-plants showed average indicators of fiber yield. From the table, it can be observed that in some of the 6 studied hybrids, the heritability coefficient for fiber yield was in the state of heterosis. In hybrid combinations, the indicator of fiber yield was 30.5-36.9 %. The amplitude of variability was different, and the coefficient of variation was 1.2-10.7 %, respectively. In particular, in the F₁ T-1985 x Surkhan-14 hybrid combination, the fiber yield sign is slightly higher than in other combinations, 36.9 %, and



the coefficient of variation is 5.8 %, indicating a very dominant heredity for this sign ($h_p=3.4$), in the combination of F_1 T-2017-2 x Ploton hybrid with low fiber yield, 30.5 %, coefficient of variation was 5.2 %, and inheritance of this character in a negative super-dominant state ($h_p=-4.6$) was noted.

Summary

Inheritance of valuable economic traits was analyzed in F_1 plants obtained by hybridization of varieties and lines belonging to *G.barbadense* L. species. It was found that among the economic traits of cotton, cotton weight per boll, fiber length, and fiber yield are inherited in a positive and negative intermediate, dominant, and extremely dominant state. In order to maintain the positive state of heterosis obtained in F_1 plants, it is necessary to continue the research work in the next generations.

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