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Inheritance of Lint Weight Per Boll in Specific and Interspecific F_1, F_2 Hybrids in Cotton

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Abstract-*The experiment aimed to study the inheritance patterns of lint weight per boll in F_1 and F_2 hybrids. The parental forms, including varieties and lines, were reciprocally hybridized to analyze the impact on lint weight per boll. The results showed variations in lint weight among the parental forms and their hybrids. No heterosis was observed in F_1 hybrids with similar lint weight per boll. Positive and negative dominance patterns were identified in F_1 hybrids involving different parental forms. In F_2 hybrids, transgressive variability and genetic contributions were observed, indicating potential for selection and breeding. The results suggest that distant parental forms and gene combinations influence the lint weight per boll in subsequent generations.*

Keywords- *Transgression, hybrid, dominant, heterosis, ecological-geographical, allotetraploid*

1. Introduction

Cotton, a versatile and widely cultivated crop, serves as a vital source of fiber in various industries. The lint weight per boll stands as a significant economic indicator, directly affecting the quantity of raw material obtained from each cotton plant. Moreover, increasing the cotton lint weight per boll has shown a positive correlation with overall productivity [1]. As a result, the scientific and practical importance of studying the hereditary factors influencing this trait becomes evident. Cotton (*Gossypium* spp.) is an economically significant crop, widely cultivated for its fiber, which plays a crucial role in the textile industry. The lint weight per boll, a key trait affecting yield and quality, is determined by genetic factors that govern its inheritance. Understanding the inheritance patterns of cotton lint weight per boll is essential for effective breeding and selection programs aimed at improving cotton productivity.

The present study addresses the problem of determining the inheritance patterns lint weight per boll in various hybrid combinations. The researchers conducted reciprocal hybridization experiments involving different varieties and lines to investigate the genetic factors influencing this trait. By analyzing the lint weight per boll in parental forms, F_1 hybrids, and subsequent generations, they aimed to shed light on the mechanisms underlying the inheritance of this important characteristic.

The scope of the research encompassed several objectives. Firstly, the study aimed to assess the variation in lint weight per boll among different parental forms, specifically focusing on the Ghalib variety, Andijan-35 variety, Namangan-77 variety, Kyzyl baraka variety, *G. mustelinum*Miers ex Watt, and T-85 line. Secondly, it aimed to examine the inheritance patterns observed in F_1 hybrid generations resulting from reciprocal hybridization. Furthermore, the research explored the variation in lint weight per boll in the F_2 generations of hybrid combinations, considering both ordinary and stepwise hybridizations.

The specific purpose of this study was to elucidate the extent to which genetic factors contribute to the inheritance lint weight per boll in different hybrid combinations. By analyzing the phenotypic variations in parental forms, F_1 hybrids, and F_2 generations, the researchers sought to identify patterns of dominance, heterosis, and transgression. This information would provide valuable insights for cotton breeders and geneticists in their efforts to develop improved cotton varieties with enhanced cotton lint weight per boll.

In summary, this article presents a study focused on understanding the inheritance patterns of cotton lint weight per boll in various hybrid combinations. By investigating the genetic factors that influence this trait, the research aims to contribute to the development of strategies for cotton breeding programs aimed at improving cotton yield and quality.

2. Literature Review

Kh.Kh. Karimov, X.A. Abdullayev and Bilal Nawaz, Muhammad Naeem, Tanwir Ahmad Malik, Ghulam Muhae-Ud-Din, Qadeer Ahmad, SairaSattar conducted a scientific research on the inheritance of lint weight in one boll. In the breeding works, it was recommended to take the best samples as the parent form when obtaining good varieties according to this sign [2,3].

In order to obtain promising varieties, scientists analyzed hybrid plants in the F_1 generation with low x low and high x high values of lint weight inheritance in per boll and recommended the use of high x high hybrids to improve this trait [4].

B.H. Amanov, S.M. Rizayeva, A.A. Mustofoqulov studied the inheritance of lint weight in per boll in families obtained by cross-breeding varieties of *G. barbadense* L. and found that there is a high possibility of separating families with large bolls based on crossbreeding with the participation of wild tropical cultivated forms [5].

The authors noted that the hybrids of wild and ruderal species are good donors for selection work aimed at improving productivity, lint weight per boll, fiber yield and quality, based on ecological and geographical separation [6,7,8].

G.N.Jurakulov studied the interrelationship between photochemical activity and the inheritance of quantitative traits in *G. hirsutum* L. hybrids of cotton and determined that the weight of lint per boll is inherited with partial dominance. [9].

Several scientists have pointed out that the lint weight in per boll is completely dominantly inherited in F_1 plants, and there is a transgression phenomenon in F_2 plants [10,11].

In F_1 plants obtained by simple and double hybridization, lint weight per boll was inherited in extreme dominance, full dominance and partial dominance, and negative heterosis was also observed in double hybrid combinations [12].

Ecologically-geographically and genetically distant F_1 of cotton intermediate, positive, negative complete and partial dominant inheritance of lint weight per boll was found in plants [13].

3. Materials and Methods

In the experiment, in order to study the inheritance of lint weight per boll in stand-alone and interspecies F_1 and F_2 hybrids, varieties belonging to the natural allotetroploid*G. hirsutum* L. and *G. mustelinum* L. species (Ghalib, Andijan-35, Namangan-77, Kyzyl baraka, *G. mustelinum*Miers ex Watt) and species with diploid number of chromosomes ($F_{[6]}$ (Kelajak x (*ssp. nanking* (white fiber) x *G. nelsonii*)) by artificial mutagenesis derived allotetroploid T-85 line was used.

The statistical analysis of cotton weight in per boll of F_1, F_2 and varieties plants was determined by the method of B.A. Dospekhov [14].

$$\overline{X} = A \pm \frac{f(Xv - A)}{n};$$

$$C = \frac{f(Xv - A)^2}{n};$$

$$\delta^2 \sqrt{= \frac{\sum [f(Xv - A)]^2 - C}{n - 1}};$$

$$S = \sqrt{\delta^2};$$

$$V = \frac{S \cdot 100}{\bar{x}};$$

$$m = \frac{S}{\sqrt{n}};$$

$$m\% = \frac{m \cdot 100}{\bar{x}}.$$

in which:

f- number of repetitions; n – number of plants; A – arbitrary average value; C – additional formula.

Dominance levels of F_1 plants were calculated using S. Wright's formula.The lint weight per boll by mathematical processing means the arithmetic mean value ($\bar{x}$), the arithmetic mean error (m), the coefficient of variation (V) and the mean square deviation (S), the accuracy of the experiment (m%) was determined using the following formulas [15].

Coefficient of dominant was accounted with following G.M. Beil, R. E. Atkins formula in first link hybrids for traits:
hp=(F_1-MP)/P-MP;
here hp -dominate coefficient;

F_1- average arithmetic indices of trait in first link;

MP- average arithmetic indices of trait of parents' form;

P- average arithmetic indices of best paternal or maternal forms;

Trait hereditary were evaluated us follows in first link hybrid: Dominant position not observed (distance) hp = 0; A little dominant 0 < hp < 1; Completely dominant hp = 1; Extremely dominant hp > 1;

Breeding coefficient (h^2) in F_2 combinations was determined by the formula given in the works of Allard (1956) [16].

4. Results and Discussion

During the experiment, in terms of lint weight per boll, among the parental forms, the highest index was for the Ghalib variety (6,4±0,34 gr.), and the relatively low index was for the T-85 line (3,3±0,1 gr.) was found to be relevant (Table 1).

In the conducted experiment, in order to study the laws of inheritance of lint weight per bag in F_1 hybrids, the varieties and lines taken as material were reciprocally hybridized. At the same time, compared to the F_1 hybrids of Ghalib, Andijan-35 and Namangan-77 plants, F_1 plants were obtained by crossing Kyzyl baraka, *G. mustelinum*Miers ex Watt and T-85 lines, which have a smaller cotton weight per boll. The results of the research were summarized and analyzed in Table 1.

No heterosis was detected in F_1 plants obtained by reciprocal hybridization with the participation of Andijan-35 and Namangan-77 varieties, which have a close index of lint weight per boll with the winning variety. The lint weight one boll of F_1 plants was in the range of parental forms. In F_1 hybrids of Ghalib and Kyzyl baraka varieties (5,5±0,2; 5,5±0,40 g), per boll weight in both forms deviated towards the Kyzyl baraka variety (hp= -0,4). In the F_1 hybrids with G. *mustelinum*Miers ex Watt, lint weight per boll is significantly different from the winning variety, even when the mother form of the winning variety is present (4,9±0,2 g), when the father form is and (4,48±0,19 g) it can be seen that this sign deviates towards the winner variety (hp= 0,7; 0,1). F_1 hybrids with the winning variety T-85 as the mother form did not germinate from the seed. In the F_1 hybrids, where the winning variety was the parent form, it was observed that the T-85 line had partial negative dominance in terms of the weight of one boll (4,6±0,26 gr.). The weight of cotton in one boll was not significantly different in F_1 plants when the winning variety was taken as mother or father. Partially positive and negative heredity was found. But heterosis was not observed (Table 1).

Inheritance of the trait "lint weight per boll" in parental forms and F_1 hybrids

Table 1

№	Domestic and interspecific F_1 hybrid combinations	Lint weight per boll (g)				
		X±m%	min-max	S	V%	*hp*
Parent forms						
1	Ghalib	6,4±0,34	4,6-8,8	1,07	16,66	-
2	Andijan-35	5,8±0,22	4,6-7,2	0,68	11,75	-
3	Namangan-77	5,6±0,2	5,1-6,2	0,53	7,45	-
4	Kyzyl baraka	5,1±0,37	3,1-7,7	1,16	22,68	-
5	*G. mustelinum*Miers ex Watt	3,7±0,25	2,3-5,5	0,82	21,69	-
6	T-85	3,3±0,1	3,1-3,9	0,31	9,68	-
F_1 plants						
7	Ghalib x Andijan-35	6±0,1	5,5-6,2	0,26	4,42	-0,4
8	Andijan-35 x Ghalib	6,1±0,34	4,1-8	1,09	17,77	0,1
9	Ghalib x Namangan-77	6,1±0,34	5-7,4	0,62	10,28	0,3
10	Namangan-77 x Ghalib	6,3±0,3	5,2-6,2	0,89	14,03	0,7
11	Ghalib x Kyzyl baraka	5,5±0,2	4,1-7	0,6	12,15	-0,4
12	Kyzyl baraka x Ghalib	5,5±0,40	2,2-9,2	1,28	23,29	-0,4
13	Ghalib x *G. mustelinum*Miers ex Watt	4,9±0,2	4-6,4	0,6	12,54	0,7
14	*G. mustelinum*Miers ex Watt x Ghalib	4,5±0,19	3,1-6,1	0,6	13,29	0,1
15	T-85 x Ghalib	4,6±0,26	3,2-6,8	0,81	17,43	-0,2
16	Andijan-35 x Namangan-77	5,2±0,19	4-6,4	0,59	11,33	-5
17	Namangan-77 x Andijan-35	4,7±0,27	2,7-6,2	0,85	18,26	-10,3
18	Andijan-35 x *G. mustelinum*Miers ex Watt	4,2±0,17	3,3-5,6	0,54	12,76	-0,5
19	*G. mustelinum*Miers ex Watt x Andijan-35	4,5±0,18	3,5-5,8	0,57	12,6	-0,2
20	Namangan-77 x Kyzyl baraka	5,5±0,2	4,4-7	0,6	11,65	0,6
21	Kyzyl baraka x Namangan-77	5,9±0,27	4,4-7,3	0,87	14,69	2,2
22	Namangan-77 x *G. mustelinum*Miers ex Watt	4,4±0,18	3,1-5,8	0,57	12,98	-0,3

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23	*G. mustelinum*Miers ex Watt x Namangan-77	3,9±0,32	2,2-5	1	25,8	-0,8
24	Namangan-77 x T-85	4,6±0,26	3,2-5,9	0,81	17,63	0,13
25	T-85 x Namangan-77	4,4±0,25	3,2-5,6	0,78	17,7	-0,1
26	Kyzyl baraka x *G. mustelinum*Miers ex Watt	4,5±0,18	3,1-5,7	0,56	12,40	0,1
27	*G. mustelinum*Miers ex Watt x Kyzyl baraka	4,5±0,19	3,1-6,1	0,6	13,29	0,1
28	Kyzyl baraka x T-85	4,4±0,33	2,2-5,8	1,06	24,2	0,2
29	T-85 x Kyzyl baraka	4,3±0,32	2,7-6,2	1,02	23,76	0,1
30	*G. mustelinum*Miers ex Watt x T-85	4,3±0,2	2,6-5,3	0,6	14,71	3,6
31	T-85 x *G. mustelinum*Miers ex Watt	3,9±0,16	3,2-4,5	0,5	12,93	1,9
32	F_1(Ghalib x Andijan-35) x Kyzyl baraka	5,4±0,18	4,3-6,2	0,56	10,49	-0,4
33	F_1(Ghalib x Andijan-35) x *G. mustelinum*Miers ex Watt	4,6±0,2	3,2-6,1	0,64	13,98	-0,2
34	F_1(Ghalib x Andijan-35) x T-85	4,4±0,26	2,8-6,3	0,82	18,69	-0,2
35	F_1(Ghalib x Namangan-77) x Kyzyl baraka	5,2±0,29	3,7-7,2	0,9	17,28	-0,7
36	F_1(Ghalib x Namangan-77) x *G. mustelinum*Miers ex Watt	4,7±0,18	3,9-6	0,57	12,08	-0,1
37	F_1(Ghalib x Namangan-77) x T-85	4,9±0,41	2,8-8,1	1,3	26,28	0,2
38	F_1(Andijan-35 x Ghalib) x Kyzyl baraka	5,3±0,28	3,9-7,5	0,89	16,74	-0,6
39	F_1(Andijan-35 x Ghalib) x *G. mustelinum*Miers ex Watt	4,3±0,19	3,6-5,6	0,6	13,72	-0,5
40	F_1 (Namangan-77 x Ghalib) x Kyzyl baraka	5,3±0,24	3,6-7,3	0,74	14,07	-0,7
41	F_1 (Andijan-35 x Namangan-77) x Kyzyl baraka	5,1±0,26	3,3-6,9	0,83	16,17	-0,2
42	F_1 (Andijan-35 x Namangan-77) x *G. mustelinum*Miers ex Watt	4,3±0,19	3,2-5,5	0,6	14,06	-0,2
43	F_1 (Andijan-35 x Namangan-77) x T-85	3,9±0,28	2,5-6,4	0,9	22,87	-0,3
44	F_1 (Namangan-77 x Andijan-35) x Kyzyl baraka)	5,5±0,25	4,2-7,6	0,78	14,13	3,1
45	F_1 (Namangan-77 x Andijan-35) x *G. mustelinum*Miers ex Watt	4,7±0,22	3,6-6,5	0,69	14,57	1,1
46	F_1 (Namangan-77 x Andijan-35) x T-85	4,6±0,15	3,6-5,1	0,47	10,32	0,8
47	T-85 x F_1 (Namangan-77 x Andijan-35)	5,3±0,23	4,5-6,7	0,73	13,65	1,9
48	T-85 x F_1 (Namangan-77 x Ghalib)	4,2±0,18	3,3-5	0,56	13,22	-0,4

Strong negative heterosis was observed in reciprocal hybrids of Andijan-35 and Namangan-77 varieties (hp=-5;-10,3) . In the reciprocal F_1 hybrids of Andijan-35 and *G. mustelinum*Miers ex Watts (4,24±0,17; 4,51±0,18 gr.) the inheritance lint weight per boll of *G. mustelinum*Miers ex Watts according to the studied character, it was found that the genes that provide it have partial negative dominance (hp = -0,5; -0,2). In both (Andijan-35 x *G. mustelinum*Miers ex Watt ;*G. mustelinum*Miers ex Watt x Andijan-35) hybrid plants, lint weight per boll of the F_1 generation was inherited intermediately. We have seen that the results of this combination and the sources of the scientific literature confirm the inheritance of this trait in the F_1 hybrids of parental forms that differ sharply in terms of one boll weight (Table 1).

During the research, it was found that the Namangan-77 variety was partially dominant (hp= 0,6) in the F_1 plants obtained by reciprocal hybridization with the Kyzyl baraka variety, which is close to it in terms of lint weight per boll (hp= 0,6). heterosis (hp=2,16) was observed. Namangan-77 strain was found to have the same relationship with *G. mustelinum*Miers ex Watt and T-85 strain as Andijan-35 strain (Table 1).

In the F_1 plants of the reciprocal hybrids of *G. mustelinum* Miers ex Watt and T-85, which differs sharply from the Kyzyl baraka variety in terms of cotton weight per boll, this trait was inherited intermediately. In all combinations, it was found that the Kyzylbaraka variety was partially dominant (hp=0,1 – 0,2).

*G. mustelinum*Miers ex Watt and T-85-line lint weight indicators per boll are close. In the F_1 plants of the reciprocal hybrids of these two species, this trait was inherited in a state of complete dominance. This situation confirmed the literature data presented above.

According to the analysis of the data in Table 1, it was found that the participation of the material as a father or mother plant in reciprocal breeding does not have a significant effect on the results of the inheritance of lint weight per boll in the first generation. More positive results were obtained in the inheritance of lint weight per boll in interspecific hybrids than in intraspecific hybrids.

In order to investigate the inheritance of lint weight per boll in the F_1 generation, Ghalib, Andijan-35 and Namangan-77 were crossed with reciprocal F_1 plants of *G. hirsutum* species Kyzyl baraka, *G. mustelinum*Miers ex Watt and T-85 lines were crossed and the inheritance of cotton weight per boll was studied in F_1 plants obtained from them.

F_1(Ghalib x Andijan-35) plants were crossed with Kyzyl baraka, *G. mustelinum*Miers ex Watt and T-85 lines, and in the obtained F_1 plants, lint weight per boll was intermediately inherited and partial negative dominance was observed.

In F_1 hybrids of F_1(Ghalib x Namangan-77) plants and F_1 hybrids of Kyzyl baraka, *G. mustelinum*Miers ex Watt and T-85 lines, this trait was inherited in an intermediate manner, partial negative and positive dominance was determined.

F_1(Andijan-35 x Ghalib), F_1(Namangan-77 x Ghalib), F_1(Andijan-35 x Namangan-77), Kyzyl baraka with plants, *G. mustelinum*Miers ex Watt and F_1 hybrids of T-85 lines in all negative dominance (hp=-0,2; - 0,7) was determined (Table 1).

The weight in per boll of F_1 (Namangan-77 x Andijan-35) plants (4,67±0,27 gr.; hp=-10,3) showed a negative result compared to the indicator of parental forms. However, this situation showed a close result of Kyzyl baraka, *G. mustelinum*Miers ex Watt and T-85 lines compared to the parental forms (Andijan-35, Namangan-77) in the weight of per boll. F_1 (Namangan-77 x Andijan-35) and Kyzyl baraka, *G. mustelinum*Miers ex Watt and T-85-line lint weight per boll is full and very dominant (hp=3,1; 1,1; 0,8) was inherited.

Reciprocal F_1 (Namangan-77 x Andijan-35) x T-85, T-85 x F_1 (Namangan-77 x Andijan-35) generations were also obtained in step hybridization. Inheritance of cotton weight per boll reproduced the results of simple reciprocal crossing in these hybrid plants.

In F_1 plants obtained by step hybridization, lint weight per boll was partially inherited in negative dominance. However, negative or positive heterosis reported in the literature was not observed (Table 1).

In the researches, F_1 plants obtained for step hybridization and Kyzyl baraka, *G. mustelinum* Miers ex Watt, T-85 lines are the parent forms with significantly different lint weight per boll. Scientists B.Amanov, S.Rizayeva,Sh.Nomozov, A.Siddikov reported the lint weight per boll. As a result of his research on heredity, he found out that in simple hybrids, the lint weight per boll is inherited intermediately in plants with drastically different parental forms. These conclusions were also confirmed in the F_1 plants obtained by step hybridization during this experiment.

In the course of the experiment, the extent of variation in lint weight per boll was also studied in F_2 hybrids of the cotton plant. Reciprocal of Ghalib, Andijan-35, Namangan-77 varieties and F_1 hybrids obtained with Kyzyl baraka variety, G. *mustelinum*Miers ex Watt wild type and T-85 ridges were replanted. Plants of other reciprocal hybrids were replanted in only one direction and the lint weight per boll in the F_2 generation was studied scientifically. Peculiarities of reproduction of this trait in F_2 generations of step hybrids were also studied. The obtained results are summarized in Table 2.

In ordinary hybrids of the winning variety obtained with other materials, the lint weight per boll is 4,6-6,9 gr. (Ghalib x *G. mustelinum*Miers ex Watt 4,6 gr.; Ghalib x Kyzyl baraka 6,9 gr.). among plants, positive transgression was observed in Namangan-77 x Ghalib and Ghalib x Kyzyl baraka plants. F_2 Namangan-77 x Ghalib hybrid combination, lint weight per boll is 6,5±0,28 gr. and from 314 studied plants 2,6-4 gr. 4 forms, 4,1-5,5 gr. 103 forms, 5,6-7 gr. 189 forms, 7,1-8,5 gr. 18 forms were recorded.

In F_2Ghalib x Kyzyl baraka hybrid combinations, the lint weight per boll is 6,9±0,42 gr. and 4,1-5,5 gr. 40 forms, 5,6-7 gr. 116 forms, 7,1-8,5 gr. 91 forms, 8,6-10 gr. 25 forms were obtained (Table 2).

In common hybrids obtained with the winning variety, the coefficient of variation was recorded in the range of V%=13,4-22,7. The results of h^2 = 0,31-0,46 was recorded on the participation of genes in the formation of lint weight per boll. In general, the results of all ordinary F_2 hybrids with the participation of the Ghalib variety were satisfactory for this character. The lint weight per boll5,6-10 gr. it is possible to continue the experiments by extracting the F_2 forms in the range.

F_2 Andijan-35 x Namangan-77, Namangan-77 x Andijan-35 and Andijan-35 x G. *mustelinum*Miers ex Watt hybrid combinations, lint weight per boll is 5,2±0,23 respectively; 5,8±0,25 and 4,6±0,36 gr. noted. 4,1-5,5 g in F_2 Namangan-77 x Andijan-35 plants. 119 forms, 5,6-7 gr. 164 forms, 7,1-8,5 gr. 24 forms received. A high coefficient of variation (V%=21,7) and high inbreeding (h^2=0,53) were observed in F_2 Andijan-35 x *G. mustelinum*Miers ex Watt hybrid combinations. It was isolated from plants with positive results of these three combinations.

The result of hybrids obtained with Namangan-77 variety Namangan-77 x Kyzyl baraka, Namangan-77 x G. *mustelinum*Miers ex Watt, Namangan-77 x T-85 hybrids obtained with red baraka variety (6,1±0, 45 gr.) was high. The lint weight per boll of F_2 hybrids obtained with the T-85 ridge is 4,3±0,44 gr. organized the The coefficient of variation (V%=30,1) and the level of reproduction (h^2=0,77) were high. Taking into account the length of the fiber of the T-85 line, 7,1-8,5 gr to obtain promising varieties plants with phenoclasts were isolated.

F_2 Kyzyl baraka x *G. mustelinum*Miers ex Watt and Kyzyl baraka x T-85 combinations by lint weight per boll (4,4±0,36 gr., 5,8±0,52 gr., respectively) positive results were obtained. Transgression was observed in F_2 Kyzyl baraka x T-85 hybrids. Both the coefficient of variation (V%=27,9) and the amplitude of variation are large. But 54 out of 140 plants are 5,6-7 gr. was noted. It was found that genetic potential (h^2=0,73) is greater than external factors in the formation of lint weight per boll in these hybrid plants (Table 2).

Although F_2*G. mustelinum*Miers ex Watt x T-85 hybrid combinations, the lint weight per boll (4,1±0,38 gr.) is less than that of F_1 plants (4,3±0,2 gr.), scored higher than the parent forms. It was found that the upper limit of variation amplitude in these hybrids (5,6-7 gr.) is greater than that of parents and F_1 plants. Taking into account the presence of genes for resistance to various effects of wild-type plants in the genotype of these plants, it can be a valuable material for future selection work (Table 2).

During the experiment, reciprocal F_1 combinations of Ghalib, Andijan-35 and Namangan-77 varieties were obtained by stepwise crossing with Kyzyl Baraka variety, wild type *G. mustelinum*Miers ex Watt and T-85 lines after replanting the plants, the variation (breeding) of the weight lint weight per boll was scientifically analyzed in the F_2 generations (Table 2). Due to the fact that *G. mustelinum*Miers ex Watt is a wild species and the T-85 line is fertile,

the F_2 plants of some hybrid combinations did not germinate from the seed.

Medium and positive transgressive variability was observed in the F_2 generation obtained by crossbreeding the F_1 (Ghalib x Andijan-35) and F_1 (Andijan-35 x Ghalib) hybrids with the Kyzyl baraka variety. F_2 (F_1 (Andijan-35 x Ghalib) x Kyzyl baraka) hybrid combination, lint weight per boll is 6,5±0,47 gr. and a total of 228 plants were studied, of which 2,6-4,4 gr. 4 forms, 4,1-5,5 gr. 56 forms, 5,6-7 gr. 104 forms, 7,1-8,5 gr. 48 forms and 8,6-10 gr. 16 forms were returned.

Lint weight per boll of F_2 plants obtained from reciprocal hybrids of Ghalib and Andijan-35 with wild type *G.mustelinum*Miers ex Watt showed similar results (4,8±0,41; 4, 8±0,45 gr.) showed.

In F_2 (F_1 (Galib x Andijan-35) x T-85) hybrids, the lint weight per boll is 3,9±0,4 gr. organized the It was found that the inbreeding h^2 =0,84. According to the analysis of the variation amplitude of this combination hybrids, it can be noted that the genes of the T-85 line were more involved in the formation of cotton weight in per boll.

In reciprocal hybrids between Ghalib and Namangan-77 cultivars, the number of F_2 generations with Ghalib as the maternal form in the plants grown by step crossing with Kyzyl baraka variety, *G. mustelinum*Miers ex Watt wild type and T-85 line the lint weight per boll showed a relatively good result. In particular, in F_2(F_1(Ghalib x Namangan-77) x Kyzyl baraka) hybrid combinations, the lint weight per boll was 6,1±0,36 gr. returning a positive transgressive variability. The above result was observed in F_2 (F_1 (Namangan-77 x Ghalib) x T-85) (4,8±0,47 gr.) hybrids, in which Namangan-77 was the mother form only (Table 2).

The scale of variation of lint weight per boll in F_2 plants

Table 2

	F_2 hybrid combinations	**Number and percentage of plants, %**	**Class n=6**						**Lint weight per boll (g)**			
			1,1-2,5	**2,6-4**	**4,1-5,5**	**5,6-7**	**7,1-8,5**	**8,6-10**	**X ± m%**	**S**	**V %**	**h^2**
1	Ghalib x Andijan-35	324	0	18	100	178	27	0	5,8±0,31	0,9	16,2	0,36
		100	0	5,6	31	54,9	8,5	0				
2	Andijan-35 x Ghalib	352	0	2	141	176	27	6	5,8±0,32	1	16,4	0,32
		100	0	0,6	40	50	7,8	1,7				
3	Ghalib x Namangan-77	301	0	12	112	106	68	3	5,9±0,23	0,7	13,4	0,42
		100	0	3,9	37,3	35,3	22,5	1				
4	Namangan-77 x Ghalib	314	0	4	103	189	18	0	6,5±0,28	0,9	14,3	0,41
		100	0	1,1	33	60,2	5,7	0				
5	Ghalib x Kyzyl baraka	273	0	0	40	116	91	25	6,9±0,42	1,2	17,4	0,46
		100	0	0	14,8	42,6	33,3	9,3				
6	Ghalib x *G.*	247	5	74	119	44	5	0	4,6±0,3	1,1	22,	0,3

	*mustelinum*Miers ex Watt	100	2	30	48	18	2	0	5		7	1
7	Andijan-35 x Namangan-77	343	0	11	225	107	0	0	5,2±0,23	0,7	14,4	0,32
		100	0	3,1	65,6	31,3	0	0				
8	Namangan-77 x Andijan-35	308	0	0	119	164	24	0	5,8±0,25	0,8	13,3	0,44
		100	0	0	38,8	53,3	7,9	0				
9	Andijan-35 x *G. mustelinum*Miers ex Watt	280	5	70	155	50	0	0	4,6±0,36	1	21,7	0,53
		100	1,8	25	55,4	17,9	0	0				
10	Namangan-77 x Kyzyl baraka	258	0	3	90	105	54	6	6,1±0,45	1,2	19,4	0,6
		100	0	1,2	34,9	40,7	20,9	2,3				
11	Namangan-77 x *G. mustelinum*Miers ex Watt	257	4	64	149	36	4	0	4,7±0,33	0,9	18,3	0,52
		100	1,6	24,9	58	14	1,6	0				
12	Namangan-77 x T-85	121	13	34	61	7	7	0	4,3±0,44	1,3	30,1	0,77
		100	11,1	27,8	50	5,6	5,6	0				
13	Kyzyl baraka x *G. mustelinum*Miers ex Watt	212	13	65	104	30	0	0	4,4±0,36	1,1	24,2	0,33
		100	6,1	30,7	49,1	14,2	0	0				
14	Kyzyl baraka x T-85	140	3	14	39	54	27	3	5,8±0,52	1,6	27,9	0,73
		100	2,1	10	27,9	38,6	19,3	2,1				
15	*G. mustelinum*Miers ex Watt. x T-85	128	6	64	46	12	0	0	4,1±0,38	0,8	19,9	0,45
		100	4,7	50	35,9	9,4	0	0				
16	F_1 (Ghalib x Andijan-35) x Kyzyl baraka	302	10	15	80	152	40	5	5,8±0,44	1,2	21,2	0,64
		100	3,3	5	26,5	50,3	13,2	1,7				
17	F_1 (Ghalib x Andijan-35) x *G. mustelinum*Miers ex Watt.	268	13	60	117	65	13	0	4,8±0,41	1,2	24,8	0,77
		100	4,9	22,4	43,7	24,3	4,9	0				
18	F_1 (Ghalib x Andijan-35) x T-85	139	20	45	65	10	0	0	3,9±0,4	1,4	31,7	0,84
		100	14,3	32,1	46,4	7,1	0	0				
19	F_1 (Andijan-35 x Ghalib) x Kyzyl baraka	228	0	4	56	104	48	16	6,5±0,47	1,25	19,3	0,4
		100	0	1,8	24,6	45,6	21,1	7				

20	F_1 (Andijan-35 x Ghalib) x *G. mustelinum*Miers ex Watt	212	2	56	112	32	8	2	4,8±0,45	1,2	24,1	0,45
		100	0,9	26,4	52,8	15,1	3,8	0,9				
21	F_1(Ghalib x Namangan-77) x Kyzyl baraka	232	0	16	60	90	51	15	6,1±0,36	0,9	14,8	0,09
		100	0	6,9	25,9	38,8	22	6,5				
22	F_1 (Ghalib x Namangan-77) x *G. mustelinum*Miers ex Watt	167	0	48	95	24	0	0	4,7±0,41	1,1	23,8	0,63
		100	0	28,7	56,9	14,4	0	0				
23	F_1 (Ghalib x Namangan-77) x T-85	109	32	66	11	0	0	0	3,2±0,28	0,7	23,1	0,2
		100	29,4	60,6	10,1	0	0	0				
24	F_1 (Namangan-77 x Ghalib) x Kyzyl baraka	275	0	21	125	113	16	0	5,5±0,36	0,9	16,3	0,11
		100	0	7,6	45,4	41,1	5,8	0				
25	F_1 (Namangan-77 x Ghalib) x T-85	119	3	25	61	22	8	0	4,8±0,47	1,3	27,1	0,73
		100	2,5	21	51,3	18,5	6,7	0				
26	F_1 (Andijan-35 x Namangan-77) x Kyzyl baraka	232	0	22	106	88	16	0	5,5±1,15	0,3	19,5	0,56
		100	0	9,5	45,7	37,9	6,9	0				
27	F_1 (Andijan-35 x Namangan-77) x *G. mustelinum*Miers ex Watt	195	13	39	65	78	0	0	4,7±0,82	2,5	53,3	0,93
		100	6,7	20	33,3	40	0	0				
28	F_1 (Andijan-35 x Namangan-77) x T-85	134	9	21	59	42	3	0	4,8±0,41	1,4	28,1	0,8
		100	6,7	15,7	44	31,3	2,2	0				
29	F_1 (Namangan-77 x Andijan-35) x Kyzyl baraka	219	0	9	72	93	42	3	5,9±0,48	1,3	22,1	0,55
		100	0	4,1	32,9	42,5	19,2	1,4				
30	F_1 (Namangan-77 x Andijan-35) x *G. mustelinum*Miers ex Watt	217	0	47	116	54	0	0	4,9±0,37	1,1	20,5	0,46
		100	0	21,7	53,5	24,9	0	0				
31	F_1 (Namangan-77 x Andijan-	192	24	57	66	36	6	3	4,3±0,53	1,4	33,1	0,81
		100	12,5	29,7	34,4	18,8	3,1	1,6				

	35) x T-85											
32	T-85 x F_1 (Namangan-77 x Andijan-35)	165	0	27	90	45	3	0	4,9±0,34	0,9	18,2	0,45

During the experiment, the reciprocal combination of Andijan-35 and Namangan-77 varieties with the wild type of *G. mustelinum*Miers ex Watt and T-85 lines were grown by step crossing and the variation of lint weight per boll was studied in the F_2 generation.

In the hybrids of reciprocal hybrids obtained with the Kyzyl baraka variety, *G. mustelinum*Miers ex Watt wild type and T-85 lines lint weight per boll of the F_2 generations obtained with the Kyzyl baraka variety was higher than the results of the hybrids of the other two materials. This result was observed in F_2 hybrids obtained by all step crossings.

Among the reciprocal step hybrids of Andijan-35 and Namangan-77 varieties, the lint weight per boll of F_2 plants with Namangan-77 variety as the mother form showed a relatively good result. Among these hybrids, F_2 (F_1 (Namangan-77 x Andijan-35) x Kyzyl baraka hybrid combinations lint weight per boll was 5,9±0,48 gr. The largest variation coefficient (V%= 53,3) and the effect of genes on the formation of the character (h^2=0,93) also shows that the high result belongs to hybrid plants F_2 (F_1 (Andijan-35 x Namangan-77) x *G. mustelinum*Miers ex Watt) was determined.

During the experiment, the variation of lint weight per boll was also observed in reciprocal F_2(F_1 (Namangan-77 x Andijan-35) x T-85) and F_2(T-85 x F_1 (Namangan-77 x Andijan-35) hybrid combinations. In F_2 (F_1 (Namangan-77 x Andijan-35) x T-85) hybrids, this characteristic was 4,3±0,53 gr., a total of 192 plants were studied, of which 24 forms of 1,1–2,5 gr., 57 forms of 2,6-4,4 gr., 4,1-5,5 gr. 66 forms, 5,6-7 gr. 36 forms, 6 forms of 7,1-8,5 g and 3 forms of 8,6-10 g were returned. The amplitude of variation is wide, with forms belonging to all six phenoclasses. (h^2=0,81) was also found to be high.

In the F_2 (T-85 x F_1 (Namangan-77 x Andijan-35)) hybrids with the T-85 line as the mother form, the lint weight per boll is relatively high, 4,9±0,34 gr., but it was observed that both the amplitude of variability and the level of breeding are small compared to F_2(F_1(Namangan-77 x Andijan-35) x T-85) hybrids.

5. Conclusion

In the researches, F_1 plants obtained for step hybridization and Kyzyl baraka, *G. mustelinum* Miers ex Watt, T-85 lines are the parent forms with significantly different lint weight per boll. Scientists B.Amanov, S.Rizayeva,Sh.Nomozov, A.Siddikovreported the weight of cotton in per boll. As a result of his research on heredity, he found out that in simple hybrids, the lint weight per boll is inherited intermediately in plants with drastically different parental forms. These conclusions were also confirmed in the F_1 plants obtained by step hybridization during this experiment.

As a result of the analysis of evidence of variability of lint weight per boll in F_2 hybrids, positive indicators were also observed in F_2 generations of plants that showed positive results in parents and F_1 hybrids. The results of F_2 plants obtained by "reciprocal+step" crossbreeding did not differ significantly. It was found that the amplitude of variability of lint weight one boll of F_2 plants between forms that are distant in origin, genotypic and geographical, and the share of genes in the formation of the character **(h^2)** increases.

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