



BOLL FORMATION, NUMBER OF BOLLS AND PERCENTAGE OF FULL SEEDS IN THE BOLLS OF F₀-F₁ HYBRIDS OBTAINED ON THE BASIS OF CROSSBREEDING OF THE LINES AND VARIETIES BELONGING TO *G. BARBADENSE* L. SPECIES

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ABSTRACT

*This article presents the analysis data on main indicators of cotton plant such as, formation of hybrid boll, percentage of formation of whole seeds in hybrid boll in F₀-combinations obtained on the basis of crossbreeding of lines and varieties belonging to fine-fiber *G. barbadense* L. species of cotton, as well as productivity indicators of F₁ plants such as, number of developing bolls in one plant, percentage of whole seeds formed in one boll, and also they were proven to have high productivity indicators.*

KEY WORDS: *hybrid, intraspecific, fine-fiber, boll, productivity, hybridization, line, variety, coefficient of variation, formation of full seeds in the boll, combination.*

INTRODUCTION

It is known that the hybridization of intraspecific specimens is one of the main factors determining the possibility of their use in practical selection as beneficial donors in the creation of promising lines and varieties of cotton. The high and low rates of the formation of bolls and seeds in the bolls during the hybridization process depend on the primary sources used in crossbreeding. Moreover, the

results of hybridization are closely related to the most important biological traits of cotton species – the biology of flowering and external environmental factors.

In cotton hybrids obtained by crossbreeding, a long-term separation process takes place in farm-valuable traits as a result of re-combination of genes (depending on the method of hybridization 8-10; 15-20 years and more). In hybrid generations, the scale



of variability and variation of traits gradually decreases, with a certain amount of relative stabilization. In addition, in the process of short-term stabilization of hybrid sources, the breeding-genetic methods of bringing them to the level of the selection family, lines and varieties have been developed. One of the developed methods is targeted selection, but in this case only phenotypic stabilization is achieved [1].

A. Seyitmusaev, A.I. Tishyn [6] have observed in their studies that in most cases, inheritance is intermittent or heterozygous in intraspecific F_1 -plants by the components that make up the yield (number of bolls per plant and weight of one boll).

In the researches of H.A.Muminov [4] it was found that in intraspecific and interspecific crossbreeding of *G. herbaceum* L. and *G. arboreum* L. subspecies, the percentage of the formation of F_0 hybrid boll is mainly low, and percentage of seed formation in the boll is high. This case, in turn, indicates the presence of genetic preclusion that serve to maintain the purity of species and forms in natural condition.

In the research conducted by B.A. Sirojiddinov [5], in F_0 hybrids of Australian and Indo-Chinese diploid cotton species, the rate of the formation of bolls and seeds, the difficulty in hybridization with each other and phylogenetically relative distances were determined.

It is known that the main productivity indicators of cotton are determined by the number of open bolls and the number of full seeds formed in a single opened boll, as well as the weight of fiber, an important raw material [2, 3].

In the research work of Ya.A. Boboev, R.G. Kim, A.B. Amanturdiyev [2], the correlation among the farm traits of cotton such as weight of cotton in one boll, the size of the boll, fiber yield and fiber length has been manifested in low rate. Cotton productivity, the number and size of bolls are inherited regardless of other farm-valuable traits.

O.L. May [7] emphasized in his studies that the traits of cotton productivity and fiber quality in cotton are controlled by several genes.

According to O.J. Jalilov, S. Odilov, A.P. Abukhovskaya [3], the effect of modification variability on farm traits of regionalized varieties of cotton Kyrgyz-3, Namangan-77, C-6524, C-9070 was studied. It was found that the average variability coefficient of the weight of cotton in one boll varies from 10,1 to 17,4%, fiber yield from 3,9-6,6%, and fiber length 2,2-5,9%.

In our study, F_0 -boll formation, the percentage of complete seeds in the bolls, and the number of bolls in one hybrid plant in F_1 plants and the percentage of full-formed seeds in a single open boll were analyzed.

THE OBJECT AND METHODS OF RESEARCH

Fine-fiber cotton varieties Termez-31, Surkhon-14, Surkhon-18, Iloton and the lines T-1926, T-2270, T-2694, T-2697, T-3150 were taken as an object.

The following methods were used to conduct research: laboratory and mathematical analysis.

RESEARCH RESULTS

As a result of crossbreeding of the lines and varieties belonging to the fine-fiber of cotton species, 14 hybrid combinations were obtained and analyzed in the laboratory. The results of the hybridization showed that the lines and varieties belonging to the studied *G. barbadense* L. species were well intertwined. It was determined that the rate of hybrid boll formation was slightly lower at 70,0–86,6% and the percentage of full seed formation in the bolls was high, 81,2–94,3% (Table 1).



Table-1
Percentage of formation of hybrid bolls and full seeds in the bolls

Intraspecific hybrid combinations	Number of crossbreedings, times	Number of formed bolls, pcs	Percentage of boll formation, %	Percentage of full seeds formation, %		
				$\bar{x} \pm S\bar{x}$	limit	V %
F ₁ T-1926 x Surkhon-14	12	9	75,0	88,1 ± 0,45	85,0-90,0	1,8
F ₁ Surkhon -14 x T-1926	15	13	86,6	90,1 ± 0,56	89,0-94,0	2,1
F ₁ Surkhon -14 x Iloton	10	8	80,0	83,6 ± 0,28	81,0-85,0	1,2
F ₁ Termez-31 x T-1926	12	10	83,3	85,7 ± 0,59	83,0-89,0	2,1
F ₁ T-2270 x Surkhon -14	14	11	78,5	82,3 ± 0,57	77,0-85,0	2,0
F ₁ T-2694 x Iloton	10	7	70,0	81,2 ± 0,61	77,0-83,0	2,3
F ₁ T-2697 x Surkhon -18	14	12	85,7	94,3 ± 0,53	91,0-97,0	1,8
F ₁ Iloton x Surkhon -14	15	12	80,0	94,1 ± 0,50	92,0-96,0	1,7
F ₁ T-1926 x Iloton	12	10	83,3	89,3 ± 0,52	87,0-92,0	1,8
F ₁ T-3150 x Iloton	10	8	80,0	82,4 ± 0,49	79,0-84,0	2,0
F ₁ T-3150 x Surkhon -18	15	11	73,3	86,5 ± 0,48	85,0-89,0	1,7
F ₁ T-2694 x Surkhon -14	14	12	85,7	86,1 ± 0,59	81,-89,0	2,3
F ₁ T-2270 x Iloton	10	8	80,0	90,2 ± 0,63	86,0-94,0	2,6
F ₁ T-1926 x Iloton	15	12	80,0	83,4 ± 0,25	82,0-85,0	1,1

In fine-fiber hybrids obtained by crossbreeding, the highest indication on boll formation was observed in the combination Surkhan-14 x T-1926, 86,6%, while the lowest rate was observed in hybrid combination T-2694 x Iloton, 70,0% relative to other hybrids (Table 1).

In fine-fiber hybrid combinations studied, the formation of full seeds in the bolls was found to be 81,2–94,3%. The highest indication on the formation of full seeds in hybrid boll was noted in the combination T-2697 x Surkhan-18, 94,3% and the coefficient of variation was 1,8%, while the slightly lower indication was in T-2694 x Iloton combination,

81,2% and the coefficient of variation was 2,3%, respectively (Table 1).

One of the most important traits of cotton is to determine the number of bolls per plant. The results of observations on this trait showed that the number of bolls formed in one bush in F₁ plants obtained by crossbreeding of lines and varieties belonging to *G. barbadense* L. species made 19,6-26,7 pieces. The highest rate recorded in F₁ Surkhan-18 x Iloton hybrid combination averaged 26,7±1,09 pieces, and the coefficient of variation was 12,9%, while the lowest indication noted in F₁ T-2006 x Iloton averaged 19,6±0,84 pieces, and the coefficient of variation was 13,6% (Table 2).

Table-2
Number of bolls and percentage of the formation of full seeds in the boll in F₁-plants

F ₁ hybrid combinations	Number of bolls in one plant			Percentage of the formation of full seeds in the boll		
	$\bar{x} \pm S\bar{x}$	Limit	V %	$\bar{x} \pm S\bar{x}$	Limit	V %
F ₁ T-1926 x Surkhan-14	21,6±0,96	16-27	14,1	88,5 ± 2,6	74,0-100,0	9,8
F ₁ Surkhan -14 x T-1926	20,4±0,67	17-24	10,4	90,3 ± 1,4	81,0-95,0	4,7
F ₁ Surkhan -14 x Iloton	23,2±1,00	19-27	13,5	89,7 ± 2,1	74,0-100,0	7,5
F ₁ Termez-31 x T-1926	22,4±0,76	19-25	10,7	90,7 ± 2,1	77,0-100,0	7,3
F ₁ T-2270 x Surkhan -14	19,8±0,70	15-23	11,2	85,4 ± 1,7	74,0-91,0	6,1
F ₁ T-2694 x Iloton	23,4±1,06	17-26	14,3	89,7 ± 2,2	80,0-100,0	7,6
F ₁ 2697 x Surkhan -18	25,2±0,89	20-29	11,0	91,3 ± 1,8	80,0-100,0	6,7
F ₁ Iloton x Surkhan -14	26,7±1,09	19-31	12,9	91,7 ± 1,4	86,0-100,0	4,9
F ₁ T-1926 x Iloton	21,8±0,96	18-26	13,8	92,7 ± 1,9	85,0-100,0	6,9



F ₁ T-3150 x Iloton	25,4±0,91	21-29	11,3	90,2 ± 2,6	76,0-100,0	9,3
F ₁ T-3150 x Surkhan -18	20,2±0,86	16-25	13,5	85,8 ± 2,6	72,0-100,0	9,7
F ₁ T-2694 x Surkhan -14	22,8±0,80	20-26	11,0	82,6 ± 2,0	75,0-95,0	7,9
F ₁ T-2270 x Iloton	19,6±0,84	15-23	13,6	86,8 ± 2,0	76,0-100,0	7,3
F ₁ T-1926 x Iloton	23,5±0,76	20-27	10,2	91,8 ± 2,0	79,0-100,0	6,4

The results of the analysis on the percentage of full seeds formed in a single boll in F₁ plants obtained by crossbreeding of lines and varieties belonging to *G. barbadense* L. species were 82,6-92,7%. The highest indication on this trait was in F₁ T-1926 x Iloton hybrid combination with an average of 92,7±1,9, and the coefficient of variation was 6,9%, while the lowest indication on the above trait was in F₁ T-2694 x Surkhan-14 hybrid combination with an average of 82,6±2,0 pieces, and the coefficient of variation was 7,9% (Table 2).

CONCLUSION

According to the analysis results of most important traits of cotton, such as formation of hybrid boll, percentage of formation of full seeds in hybrid boll in F₀ hybrid combinations obtained as a result of crossbreeding of lines and varieties of *G. barbadense* L. cotton species, and the most important productivity traits of cotton in F₁ plants, such as the number of bolls formed in one plant and the percentage of full seeds formed in one boll, it can be concluded that they had high yield indicators.

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