American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 02 ISSUE 12 Pages: 47-51
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1290679216 METADATA IF – 5.625
Publisher: Oscar Publishing Services

Research Article

Journal Website: https://theusajournals.com/index.php/ajahi

INHERITANCE AND FORMATION OF SOME ECONOMICALLY VALUABLE TRAITS IN COTTON HYBRIDS F1, F2 AND F3

Submission Date: December 20, 2022, Accepted Date: December 25, 2022,
Published Date: December 30, 2022
Crossref doi: https://doi.org/10.37547/ajahi/Volume02Issue12-10

G.N.Narkizilova
National University Of Uzbekistan Named After Mirzo Ulugbek, Uzbekistan

M.S. Mirakhmedov
National University Of Uzbekistan Named After Mirzo Ulugbek, Uzbekistan

S.G.Boboev
National University Of Uzbekistan Named After Mirzo Ulugbek, Uzbekistan

ABSTRACT

In the article presents results of analysis of inheritance and variability of some agronomic valuable traits in hybrids obtained with participation of cotton varieties that differ sharply in origin. Studied plants F1, it was found that complete dominance of unlimited type of branching in F1, effect of heterosis, complete dominance and intermediate inheritance depending on the genotype of the parental forms according to traits of precocity and weight of 1000 seeds. In the inheritance of fiber length in F2 hybrids, a wide range of variability was revealed and a markedly high variability in interspecific hybrids compared to simple hybrids. From F3Sultan x Surkhan-14 combination were selected and recommended families for breeding.

KEYWORDS

Cotton, genotype, hybrid, dominance, heterosis, inheritance, variability, recombinant, agronomic traits.

INTRODUCTION

American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 02 ISSUE 12 Pages: 47-51
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1290679216 METADATA IF – 5.625
Publisher: Oscar Publishing Services

In the development of the country's cotton growing, much attention is paid to the creation of early, productive, resistant to diseases and pests of cotton varieties with high rates of economically valuable traits and fiber quality.

In cotton genetics, each method has its own advantages. Positive results can be obtained using both the intraspecific hybridization method and the use of interspecific hybridization.

In enriching the genotype of created varieties with unique traits, interspecific hybridization involving wild and ruderal forms is one of the main methods of modern genetics and breeding [2,3].

Each type of cotton has its own unique characteristics and properties. The effective use of these species makes it possible to combine unique traits in one genotype. So, in the studies of D.A. Musaev [5], M.F. Abzalov [1], the patterns of inheritance of economically valuable traits of cotton were studied and polygenic control of quantitative traits was established, and the possibility of combining positive traits in one genotype and the selection of forms with a combination of these features.

RESEARCH METHODS

The studies used methods of intraspecific and interspecific hybridization. Using these methods, hybrids were obtained with the participation of varieties of different origin and with a sharp difference from each other. The experiment, phenological observations and laboratory analysis were carried out according to the generally accepted methodology. Mathematical analysis of the obtained results was carried out according to B.A. Dospekhov [4]. Conditionally designated form K-28 isolated from a complex hybrid F1(F1G.thurberii Tod. x G.raimondii Ulbr.) x G.arboreum L.

RESEARCH RESULTS

As you know, the productivity of a plant is a complex trait, consisting of a number of its constituent elements. The main elements of cotton productivity are such characteristics as the number of bolls per plant, the weight of raw cotton per bolus and the weight of 1000 seeds. Many scientists have studied inheritance, variability and the formation of these traits, in particular D.A. Musaev, (1979), M.F. Abzalov, (1991), S. Boboev (2017).

In our studies, we studied the inheritance of the weight of raw cotton in one box and the weight of 1000 seeds in F1 hybrid combinations obtained with the participation of varieties and accessions with different genetic backgrounds.

In terms of the weight of raw cotton in one box, the parental indicators were more than 6 g, families O-107-12 (7.0 g), O-160-71 (6.8 g) and varieties "Baraka-79" had especially high rates. (6.6 g) and SP-1303 (compressed form, 6.6 g). Only the L-282-85 line had a slightly lower indicator (5.0 g.).

In F1 hybrids obtained with their participation, dominance and intermediate inheritance were noted. In the hybrid combinations F1 O-160-71 x Baraka-79 and F1 L-282-85 x L-1380, the average value of the trait was in the range of indicators of parental forms, i.e. intermediate inheritance is established. Average indicators of hybrids F1 SP-1303 x L-282-85 (6.8 g), F1 O-107-12 x L-282-85 (7.3 g) and F1 O-87-91 x "Sakhovat" (7.4 g) were much higher than those of the parental forms, which indicates the manifestation of the effect of heterosis (hp=1.6; 1.3; 7.0, respectively) (Table 1).

American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 02 ISSUE 12 Pages: 47-51
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1290679216 METADATA IF – 5.625
Publisher: Oscar Publishing Services

Among the parental forms, the SP-1303 variety (compressed form) of 140 g had the highest average weight of 1000 seeds, and the L-282-85 line (118 g) had the lowest. Also high results were shown by families O-107-12 (136 years old) and O-87-91 (134 years old).

Table 1

Inheritance of some elements of productivity in hybrids F1

№	Material	n	Weight of raw cotton 1 box. (G.)	hp	Weight of 1000 seeds (g).	hp
1	T-282-85	20	5,0±0,3		118±1,3	
2	Baraka-79	20	6,6±0,3		132±1,6	
3	SP-1303	20	6,4±0,2		130±1,2	
4	T-1380	20	6,5±0,1		130±1,8	
5	O-107-12	20	7,0±0,4		136±1,5	
6	O-87-91	20	6,5±0,3		134±1,3	
7	O-160-71	20	6,8±0,2		132±1,4	
8	SP-1303 (compressed form)	20	6,6±0,3		140±1,3	
9	Sakhovat	20	6,2±0,1		130±1,2	
10	F_1T-282-85xT-1380	50	6,1±0,4	2,0	136±2,4	0,46
11	F_1СП-1303xT-282-85	50	6,8±0,5	1,3	132±2,5	1,6
12	F_1O-107-12xT-282-85	50	7,3±0,4	0,9	135±3,4	1,3
13	F_1O-87-91x Sakhovat	50	7,4±0,6	5,0	142±3,2	7,0
14	F_1O-160-71xBaraka-79	45	6,7±0,5	1,0	133±2,5	0,1
15	F_1 СП-1303 (condensed form) x Baraka -79	50	6,8±0,3	1,0	140±3,1	0,2

The indicators of F1 hybrids by weight of 1000 seeds were in the range of 132-140 g. A relatively low result was noted for F1 O-1303 x L-282-85 (132 g.), a high result for F1 O-87-91 x "Sakhovat" (142 g.). In the hybrid

American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 02 ISSUE 12 Pages: 47-51
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1290679216 METADATA IF – 5.625
Publisher: Oscar Publishing Services

combinations F1 O-107-12 x L-282-85 and F1 SP-1303 (form 2) x "Baraka-79", the dominance of the parental form with a high indicator of the trait was revealed, and positive heterosis was noted in the remaining 4 hybrid combinations. Hybrid combinations F1 L-282-85 x L-1380 (hp=2.0) and F1 O-87-91 x "Sakhovat" (hp=5.0) exceeded the parental forms by 6-18 g.

In general, F1 hybrid combinations according to the characteristics of the weight of raw cotton in one box and the weight of 1000 seeds have established intermediate inheritance, complete dominance and heterosis, depending on the genotype of the parental forms. The established patterns in the inheritance of these traits show the possibility of isolating recombinants that combine large boxes and a high mass of 1000 seeds.

Fiber length. The length of the fiber is one of the most important features that determine the quality of the fiber. We studied the inheritance of this trait in intraspecific and interspecific hybrids F2 and F3 with the participation of species forms G.hirsutum L. and G.barbadense L.

Among the parental forms, the variety "Surkhan-14" (37.8 mm) had the highest indicator of fiber length, and the lowest was the variety "Sultan" (34.0 mm). The fiber length of other parental forms was in the range of 34.1-35.2 mm. The average fiber length in the intraspecific hybrid F2 "Jarkurgan" x "Omad" ranged from 34.5 mm, and in F2 "Sultan" x SP-1303 34.8 mm. Indicators of the coefficient of variability were V=7.34% and V=8.61%, respectively.

The interspecific hybrid F2 "Sultan" x "Surkhan-14" had an average fiber length of 36.2 mm. It was noted that the location of plants in the middle and right classes of the variation series was influenced by the genotype of the paternal variety "Surkhan-14". Plants with a fiber length of 39-41 mm were split off. In combinations F2 (F1K-28) x C-4727 and F2 (F1K-28 type arbor.) x Omad, the average fiber lengths were 34.5; 34.6 mm respectively, i.e. were in the range of parental forms. Despite this, left-and right-sided transgressions were revealed in interspecific hybrids. The degree of variability of interspecific hybrids was V=10.18%, V=12.05% and V=13.6%, respectively, and was significantly higher than that of intraspecific hybrids.

The fiber lengths of the intraspecific F3 hybrids were almost the same, i.e., 34.6; 34.7 mm. The plants of both hybrid combinations were located in 6 classes of the variation range, from 31.1-32.0 mm to 36.1-37.0 mm, the degree of variability was V=5.21 and V=5.89%, respectively (Table 2).

Table 2

Formation of fiber length in intraspecific and interspecific hybrids F3

№	Parent forms and hybrids F_3	n	M ± m	V %
Parent forms				
1.	Sultan	35	33,9±0,30	3,58

American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 02 ISSUE 12 Pages: 47-51
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1290679216 METADATA IF – 5.625
Publisher: Oscar Publishing Services

2.	Omad	45	34,8±0,28	3,32
3.	C-4727	34	34,3±0,23	2,86
4.	Surkhan-14	30	37,8±0,25	2,94
5.	Jarkurgan	42	35,2±0,30	3,94
6.	SP-1303	43	35,0±0,35	4,06
Intraspecific hybrids				
7	F_3 Jarkurgan x Omad	41	34,7±0,36	5,21
8	F_3Sultab x SP-1303	42	34,6±0,41	5,89
Interspecific hybrids				
9	F_3 (F_1K- 28) x C-4727	54	34,0±0,42	7,09
10	F_3(F_1K- 28 type arbor.) x Omad	63	34,1±0,38	7,25
11	F_3 Sultan x Surkhan -14	47	36,3±0,61	10,34

In interspecific hybrids, in particular in the combination F3 "Sultan" x "Surkhan-14" (x=36.3 mm), the variability was higher (V=10.34%) than in intraspecific hybrids. Interspecific hybrids F3 (F1K-28) xS-4727 and F3 (F1K-28 type arbor.) x "Omad" had an average value of 34.0 and 34.1 mm, respectively.

CONCLUSION

The results obtained make it possible to conclude that the genotypes of parental forms involved in intraspecific and interspecific crossings significantly affect the inheritance and variability of the fiber length trait. From the interspecific hybrid combination F3 "Sultan" x "Surkhan-14" unique families with a fiber length close to the species G. barbadense L were isolated and recommended for breeding.

REFERENCES

1. Abzalov M.F. Gossypium hirsutum L. Gene interactions in cotton. Tashkent, Science, 2010. P.6-68.
2. Arutyunova L.G. etc. //Biology of cotton.-Tashkent, 1980. -P. 79.
3. Boboev S.G., Muratov G.A., Namazov S.E. Synthesis of bovine intergenomic hybrids and the effect of intergenomic hybridization on breeding //Proceedings of the scientific-practical conference "The current situation and development prospects of the field of selection and breeding of agricultural crops", Tashkent, 2015. P.111-113.
4. Armor B.A. Methods of field experience. Moscow,1985. P.126-145.
5. Musaev D.A. Genetic collection of cotton and problems of trait inheritance. - Tashkent, Science, 1979.- P. 164.