Original Article

The Study of the Combination Ability of Cotton Varieties

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Abstract

Annotation: The article presents the results of a study of the crossing ability of cotton varieties in terms of yield in 2019-2021. At the same time, on average, high yields were observed in the varieties "Sultan", "S-7300", "Ilgar" from maternal forms, as well as "UzPITI-202", "Andijan-36", "UzPITI-201" varieties from paternal forms. The efficiency of general crossability (OCS) was noted among the maternal forms in the varieties "Sultan" and "Ilgar", and among the paternal forms in the variety "UzPITI-202".
In other varieties, the efficiency of ACS is unstable over the years, showing an inefficient indicator based on the average annual indicator.
In terms of productivity, it was found that the overall crossability of the varieties "Sultan", "Ilgar" and "UzPITI-202" is high.These varieties are recommended as primary material for cotton breeding.

Keywords: Cotton, variety, parent, topcross, combination, crossing, first generation, common crossing (OCS), private crossing (SCS), ability.

INTRODUCTION

As President Sh.M.Mirziyoev's speech on the occasion of the Day of Agricultural Workers in December emphasized, breeders-scientists and specialists set priority tasks such as "creating cotton varieties suitable for the soil-climatic conditions of each region and developing their unique agro-technologies". Paragraph 3.3 of the Decree of the President of the Republic of Uzbekistan dated February 7, 2017 "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan" No. PF-4947 on the development and modernization of agriculture, with high productivity, resistant to diseases and pests, adapted to local soil-climate and ecological conditions the tasks of expanding scientific research work on the creation and introduction of new selection varieties of agricultural crops into production were defined.

In order to create cotton varieties that meet the requirements of the present time, there should be diverse and well-studied initial sources (donors). The varieties created and put into practice in recent years are characterized by positive morphobiological signs and technological quality indicators. Effective and correct use of the cotton gene pool, i.e. samples of wild, semi-wild forms and varieties present in it, is of great importance in the creation of such varieties. [1]

It is known that the research institutes engaged in selection and a number of scientific institutions produce cotton varieties adapted to different soil-climatic conditions of the Republic every year, with high morphological, biological, technological-quality indicators, drought and disease and insect resistance. created and submitted to the state variety testing departments for comparison and testing with the main varieties grown in these regions. However, the new cotton varieties presented for testing can have plastic parameters in different soil-climatic conditions if they incorporate in their genotypes yield, early maturing, high fiber yield and quality, as well as disease and pest tolerance. Otherwise, it is inevitable that the indicators shown in the soil-climate conditions of one region will be lower in the soil-climate conditions of other regions.[2, 3]

THE SOLUTION TO THE PROBLEM

In this regard, the main crop for cotton farms today is the need to create fast-ripening, productive, high-quality, morpho-biological and valuable economic biotypes with high fiber content per hectare, which ripens in September.

Especially in the creation of new varieties, hybridization of the paternal and maternal varieties selected for crossbreeding without determining the ability to cross them leads to a large amount of work. Therefore, it is necessary to first determine the general and special hybridization of the varieties to be used for crossbreeding.

Taking this into account, we crossbred several varieties and studied the general and special crossbreeding ability of the varieties with high general and special crossbreeding ability among them.

RESEARCH METHOD AND PLACE

The experiment was conducted at the Andijan scientific-experimental station of the Scientific-Research Institute of Cotton Selection, Seeding and Cultivation. The soil of the experimental field at the Andijan scientific-experimental station is light gray and has been irrigated for a long time. Sizot waters are located at a depth of 3-5 meters. The experimental varieties were planted in 4 rows, 90x20-1 in 4 rows. In the experimental field, the following observations were made after seed germination:

- 100 percent germination of seedlings;
- Cotton growth and development in June, July, August, September 1;
- 50 percent flowering of cotton;
- 50 percent opening of cells;
- calculation of cotton yield of varieties;
- a sample of 25 pieces of cotton of each variety was taken.

The fiber length, fiber output, weight of one skein of cotton and technological properties of the fiber were determined from the samples.

Observations and calculations were carried out according to the method of "Methods of conducting field experiments" (UzPITI-2007), selection studies "Variety testing of agricultural crops" (1971). Mathematical processing of research data B.A.Dospekhov it was performed based on "Field experiment methodology" (M. Kolos, 1985). The agrotechnical measures used in cotton care were carried out based on the agrotechnical rules adopted at PSUEAITI Andijan scientific-experimental station. Feeding with mineral fertilizers was carried out according to the plan established in the experimental system.

RESEARCH RESULTS

As a result of the study of new varieties of cotton, it is necessary to select parental forms and obtain hybrids from them, to study and analyze selection samples by making a crossbreeding plan.

In the experiment conducted by us, it was aimed to study the general crossbreeding (ox) and special crossbreeding (sks) abilities in the first generation of hybrid combinations obtained by the method of cross-breeding (topcross) in cotton varieties belonging to the G. Hirzutum type. For cross-breeding, varieties with different economic characteristics and different origins were selected and the parental forms were self-pollinated for three years, and then cross-breeding was carried out for three years. (Table 1)

Table 1: Crossing was carried out in the following order

Fatherhood and motherhood	Andijan-36	UzPITI-201	UzPITI--202	UzPITI--203
Ilgar	X	X	X	X
Sulton	X	X	X	X
Andijan-40	X	X	X	X
S-7300	X	X	X	X
Bukhara-102	x	X	X	X

Breeding work was carried out in advance by removing the male pollinators and protecting them with the help of special bags.

Productivity is one of the main valuable indicators for the economy, and it is mainly determined by the weight of each boll of cotton, the number of bolls per plant, the number of pods per boll, the number of seeds in it, etc. Also, cotton productivity may vary depending on the external environment, soil-climate conditions and agrotechnical factors.

Therefore, there are certain difficulties in carrying out selection work on this sign. In the study, information was obtained on the general (ox) and special (sks) hybridization abilities of varieties based on the above indicators. According to the average, high yield was observed in "Sultan", "S-7300", "Ilgar" varieties of maternal forms, and "UzPITI-202", "Andijan-36", "UzPITI-201" varieties of paternal forms. The efficiency of total cross-breeding ability (OKS) was recorded among maternal forms in "Sultan" and "Ilgar" varieties, and among paternal forms in "UzPITI-202" variety. (Table 2)

Table-2 General cross-breeding (ox) abilities (g1, g1) of cotton varieties in terms of productivity efficiency (one plant product, gr.)

Навлар (оналик шакли)	2019 y		2020y		2021 y		Varieties (paternal form)	2019 y		2020 y		2021 y	
	x	g^1	x	g^1	x	g^1		x	g^1	x	g^1	x	g^1
Ilgar	59,4	-1,0	64,4	+1,2	70,8	+2,4	Andijan-36	60,3	-0,1	60,8	-1,3	64,2	-1,9
Sultan	63,6	+3,2	66,0	+2,8	73,1	+4,76	UzPITI-201	60,0	-0,4	63,0	+0,9	66,3	+0,2
Andijan-40	59,7	-0,7	63,5	+0,3	69,3	+0,96	UzPITI-202	61,4	+1,0	64,2	+2,1	69,1	+3,0
S-7300	63,2	+2,8	62,3	-0,9	66,9	-1,47	UzPITI-203	59,8	-0,6	60,5	-1,6	64,7	-1,4
Bukhara-102	55,9	4,0	59,7	-3,5	61,7	-6,64							
Average	60,4		63,4		68,4			60,4		62,1		66,1	
(g^1, g^1)	±0,98	±1,93	±1,07				(g^1, g^1)	±0,84	±1,03	±0,96			

In other varieties, the efficiency of OKS has been unstable over the years, showing an ineffective indicator based on the annual average.

SUMMARY

Summing up, it should be noted that "Sultan", "Ilgar" and "UzPITI-202" varieties have high general hybridization ability. In the experiment, the special mating abilities (SKS) of the first generation hybrids were also studied. Based on the information obtained in this process, it was determined that "Sultan", "UzPITI-202" and "Ilgar", "UzPITI-203" are combinations that have shown reliable and stable heterosis over the years. It was observed that SKS efficiency and dominance coefficient are high in them.

In the three-year experience, it was proved that the indicators of general crossbreeding ability (OKS) are inferior to special crossbreeding ability (SKS). This confirms the stability of additive genes compared to non-additive genes.

It was revealed that "Andijan-36" (39.5%), "Bukhara-102" (37%) and "UzPITI-202" (37%) have the highest three-year index of fiber output. According to this sign, the donor property was determined in "Andijan-36", "Bukhara-102", "UzPITI-202" varieties. Therefore, it is recommended to carry out hybridization work on a large scale for breeding purposes in these varieties.

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