



# INHERITANCE FOR EARLY MATURITY OF F<sub>1</sub> HYBRID COMBINATIONS BASED ON AMERICAN AND MEXICAN COTTON VARIETIES IN KARKALPAKISTAN

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## ANNOTATION

Due to the short growing season in Karakalpakstan, high-yielding, intensive, optimally constructed new plants have not been created yet. In order to solve this problem, it is possible to change the negative correlation between fastness, fiber yield, length and productivity by supporting different hybridization methods from the US and Mexican cotton collection. In order to create high-yielding and high-quality varieties, based on the study of collection samples brought from the centers of origin of cotton, as well as from the USA and Mexico, they were involved in crossbreeding them with regionalized and promising new varieties in the conditions of Karakalpakstan. As a result, F<sub>1</sub> plants with an intensive and optimal structure were superior to their parents in almost all combinations of quick-growing traits, and the possibility of selecting quick-growing genotypes was created. It was found that the quickness sign is a polygenic sign and depends on the genotype of the sample participating in the crossbreeding.

**KEY WORDS:** seed, heredity, hybrid, rapid maturation, hybridization, variability, hybridological analysis, reciprocal breeding, productivity, single selection, genotype, new collection samples.

## INTRODUCTION

In recent years, the task of creating and producing medium fiber cotton varieties in Karakalpakstan has become more and more urgent. In this case, the issue of increasing the fiber yield of medium fiber cotton varieties is the most important. Simple hybridization has been widely used by breeders for many years. But most of this work is more focused on creating medium fiber varieties. Because there are special signs and characteristics of each variety. The fiber quality of these medium-fiber cotton samples corresponds to type V in the Karakalpakstan soil and climate conditions, but the fiber yield does not exceed 35.0-36.0 percent. The reason for this is that most of the seeds of *G. hirsutum* L type are hairy, yield, quick ripening and quality indicators are not high. Therefore, to date, the fiber yield of medium-fiber varieties differs sharply compared to varieties created in different soil and climate conditions. The continuous development of agriculture and technologies increases the demand for new varieties of agricultural crops. For example, the new variety has high yield, good fiber quality and fast ripening, as well as resistance to adverse environmental factors and many other characteristics it is necessary to create a medium-fiber cotton variety with an optimal structure of the bush obtained with the participation of American and Mexican variety samples.

According to O.E. Kochkarov, S.S. Alikho'zhaeva, S.A. Usmanov, F.A. Abrarova, B.K. Madratov [1], studying the adaptability of plants to various unfavorable conditions, determining the adaptation mechanism in which they are



resistant to unfavorable conditions and is of great importance in the principles of developing resistance to other discomforts.

According to I.A. Aliev [2], precocity is related to the height of the first harvest branch, the beginning of flowering and the rate of opening of pods.

Fast cooking is a complex polygenic trait, the length of the periods that determine it is variable to varying degrees. A number of genetic signs of early ripening, for example, the location of the first harvest horn, the number of bolls and the weight of cotton per boll, the number of seeds and its weight, the length of fiber and the accumulation of cellulose in it, are visible depending on the peak [3].

The results of recent research show that the effectiveness of creating hybrids and varieties suitable for soil and climate conditions for a high and high-quality cotton crop depends on the correct selection of the starting material. In order to create varieties that produce high and high-quality yields, it is an urgent issue to study the collection samples brought from the USA and Mexico, from the centers of origin of cotton, and to create starting material for intensive selection with the optimal structure of the bush, obtained as a result of crossing them with regionalized and promising new varieties in the conditions of Karakalpakstan.

Taking into account the above, it is necessary to study the new selection lines obtained from direct and reciprocal cross-breeding from the cotton collection in the natural soil and climate conditions of Karakalpakstan, that is, the best single selections picked in the field conditions are the main valuable farm. As a result of selection of complex, intensive, optimal structural forms of cotton, we aimed to use initial materials in practical selection works to create new varieties, while determining the variability of the signs.

## RESEARCH METHODS

Researches were carried out in the laboratory "Cotton selection and seed production" of the experimental field of the Karakalpakstan agricultural scientific-research institute. Conducting experiments In 2017-2018, 100 samples of US and Mexican varieties were planted in the field of the institute in a general manner in the order of 60x25x1, in three rows, with 15 cells. During the growth period of the plants, the periods of germination, budding, flowering and opening of pods were observed and recorded, and valuable economic signs were determined. During the germination period, from the germination of the first tuber plant to the end of germination, plant wilting was determined every 2 days, and germination was determined at 50%. The obtained results were evaluated according to the difference compared to the new C-4727 taken as a measure

C-4727, Omad, Sultan, Chimboy-5018 and KK-3535 varieties regionalized in the Republic of Karakalpakstan were planted together with the isolated samples in 2020. During the growth period of the plants, the observation work carried out in previous years was fully returned.

Cross-breeding was carried out in the reciprocal order during the flowering period of the plants. F<sub>1</sub> plants obtained in 2021 were fully returned to the observation work carried out in previous years. The expected goal is to study the formation of the main economic and morphological characters in the hybrids obtained as a result of crossbreeding.

Selections from each hybrid combination and individual selections were harvested during pod opening. The weight of cotton in one bag, fiber yield and length, as well as quality marks were determined for these picked items. The fiber quality was determined by the HVI system in the regional laboratory "SIFAT" of the Republic of Karakalpakstan.



The obtained data were subjected to statistical processing in the style of B. A. Dospekhov [4].

$$X = \frac{\sum fX}{n} \quad S = \frac{\sqrt{\sum f(X_n - X)^2}}{n-1}$$

$$V = \frac{S \cdot 100}{X} \quad Sx = \frac{S}{\sqrt{n}}$$

here:

f – volatility index;

X- class average;

n- selection size;

Sx-mean arithmetic error;

V- variability coefficient;

S- average arithmetic mean;

The degree of dominance was calculated according to the formula of S. Wright according to the method presented in the work of Abdul Djalil Hassan Muhammad Al Harani [5] where:

$$hp = \frac{F_1 \cdot MP}{P - MP}$$

$F_1$  – average arithmetic index of the hybrid;

MP – average arithmetic index of parents;

P– arithmetic exponent of the best parent;

hp - dominance coefficient.

## RESEARCH RESULTS AND THEIR ANALYSIS

Fastness studied in our experiments is one of the most important biological characteristics in agricultural crops. Maturity is determined by the duration of periods from germination to heading, from heading to flowering and from flowering to maturity.

A.A.Abdullaev, M.V.Omelchenko[6] stated that, regardless of which form is involved in hybridization, the formation will deviate towards the parent.

According to the research of U.Aitzhanov and I.J.Sagatdinov[7. 8], it was found that the cotton hybrids obtained with the presence of mutant varieties are 2.5-3.0 days earlier than the parent sample.

One of the most important characteristics of quick cooking is the opening period of the blisters. In our research in the soil and climatic conditions of the Republic of Karakalpakstan, the period of cotton to the opening of the  $F_1$  plants was in the range of 103.5-114.7 days (Table 1). In particular, the  $F_1$ (S-4727 x 011782) hybrid with a positive result in this generation had a maturity of 104.7 days, and the difference from the parent was -5.0; It was 10.8 days. In the reciprocal form of this hybrid, the indicator was 106.9 days, and it was observed that it was -9.6 days earlier than the maternal material. Of course, we can see that the number 011782 collection sample is early, that is, it has a higher rate compared to the parents.

## CONCLUSION

Based on the above analysis, it can be concluded as follows:

1. In the studied  $F_1$  plants, a state of heterosis was observed in most of the combinations according to the sign of early maturity.

2. It was proved during our research that the early ripening sign in cotton is polygenic, like a number of other signs, and it was found that the early ripening of hybrids depends on the maternal or paternal participation of the samples involved in crossings and their genotype.

3. In the hybrid combination  $F_1$  (S-4727 x 011843) that participated in our research, the period until the opening of pods was 108.8 days, while the period before the opening was 110.0 days when the variety C-4727 participated in



our research. In this case, it was observed that the hybrid was 1.2 days earlier than the variety C-4727, and 10.9 days earlier than the US sample number 011843, which participated as a father.

4. In the hybrid combination  $F_1$  (011843 x C-4727) with the US sample as the mother, the early maturity of the hybrid was 106.0 days, and it was observed that it was 2.9 days and 4.9 days earlier than the parent sample. Also, the amplitude of the sign change in this combination was 1.6%.

5. In the studied  $F_1$  (011761 x Chimboy-5018) and  $F_1$ (011656 x Chimboy-5018) hybrid combinations, the ripening rate is 108.2, respectively; It was 109.0 days. The difference from the parent forms is  $-3.7 +4.3$ ; and it was found to be  $-5.4, +0.5$  days.

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