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Research Article

PHENOLOGY AND INHERITANCE OF MORPHOLOGICAL HARACTERS IN INTERSPECIFIC HYBRID PLANTS OF COTTON AND THIN-FIBER COTTON VARIETIES (IN CLIMATE CONDITIONS OF SIRDARYA REGION)

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ABSTRACT

Cotton Gossypium L. in the soil and climatic conditions of the Syr Darya is a cultural tetraploid from the family of G.Barbados L. The phenology of flowering in varieties belonging to the genus has been studied. According to it, of the selected research objects, the varieties Surkhan-18, Termez-202 and Surkhan-103 have a high possibility of continuing genetic and breeding processes in the conditions of the Syrdarya region and using these varieties to create hybrid organisms.

It is important to study the morphological characteristics of the hybrids obtained on the basis of cross-breeding of different types of cotton, and to scientifically substantiate aspects such as the order in which the laws are passed. Because each variety has its own morpho-biological characteristics, and in most cases, morpho-biological

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characteristics (type of branching, leaf shape, shape and color of pods, the presence of anthocyanin spots on the petals, color of pollen, etc.) are taken into account when evaluating the variety. Also, on the basis of phenotypic analysis of the hybrids obtained by hybridization of varieties and species that are sharply different from each other in terms of morphological characteristics, it is possible to make a clear conclusion about the manifestation of morphological characteristics of one or another variety in hybrid plants. In order to successfully carry out breeding and create new hybrid plants that incorporate the best characteristics of the initial varieties, it is necessary to know the laws of passing morphological characteristics from one generation to the next, along with the valuable economic characteristics of cotton.

KEYWORDS

Fiber, cultural, type of branching, hybrid plants.

INTRODUCTION

Fine -fiber variety of cotton, long-fiber variety of cotton and the cotton that gives a fiber of 37-42 mm or more. Fine - fiber cotton mainly includes varieties of Gossipium barbadense L type. In the world production of cotton wool, fine-fiber gauze ranks second after gauze with medium fibers. Fine-fiber cotton is grown on large areas in many countries, including Uzbekistan, Tajikistan, Turkmenistan, Egypt, Sudan, Peru, Northern Brazil, Nigeria, and the USA.

In the Republic of Uzbekistan, fine-fiber cotton varieties are grown mainly in the southern regions (Surkhandarya, Kashkadarya, Bukhara, Andijan, Namangan regions).

In order to introduce a mechanism to stimulate the development of agrotechnologies for the creation of high-yielding, disease- and pest-resistant, fast-growing, high-yielding varieties of fine-fiber cotton, taking into account the soil and climatic conditions of the regions, expanding their acreage, reproduction and cultivation of seeds of new and promising varieties, the Cabinet of Ministers of the Republic of Uzbekistan No. 47 dated January 30, 2020 "On Amendments and additions in the resolution of the Cabinet of Ministers of the Republic of Uzbekistan on the efficient organization of the production of fine-fiber cotton, on the introduction of the mechanism of reproduction and stimulation of new varieties" .

These measures have been approved by the Government, and a number of important tasks have been assigned to responsible ministries and departments. The tasks of harvesting a sufficient amount of seed material from fine-fiber cotton varieties suitable for the soil and climatic conditions of

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the regions of the republic, precocious, with high yield and fiber quality have been set.

The weather in the Syrdarya region is sharply changeable and dry. The average annual temperature is 14 °C. Summers are dry and hot. The average temperature in July is 27-29 °C. In summer, the temperature rises to 32-45 ° C. Often a warm wind (garmsel) dries the soil and has a bad effect on the development of plants. The growing season is 218 days. In summer, due to strong evaporation, groundwater salines the soils of surface areas (Sharaf Rashidov, Akaltyn, Gulistan districts).

The soils are mainly weakly sod-podzolic with a light shade, less often and moderately saline, according to the mechanical order-loamy and sandy loam. Saline and saline soils are found on the plains. Underground water pipe. 5-6 meters [1,2,3].

At the same time, it is worth noting that fine-fiber cotton varieties are resistant to very hot weather conditions, dehydration, harmsel insecticides and pests, as well as fiber length, its elasticity and textile. The economic efficiency of their cultivation is 60 percent higher than that of other varieties [4,5].

From this point of view, the experiment is aimed at carrying out in the conditions of the Syrdarya region, i.e. testing of fine-fiber cotton varieties in the conditions of the Syrdarya.

METHODS

The area of the fabric is 25 m in length and consists of 30 rows. So that the length of each row is 2 m, and the distance between the rows is 76 cm. The experimental field was being prepared for sowing seeds. The order of sowing seeds was as follows, that is, each variety was planted in 6 rows, in each row 6 nests, in each nest 5-7 dry seeds with an interval of 25-30 cm. The object of the experiment was a cultural tetraploid of G.barbadense L. type created on the basis of fine-fiber varieties Surkhan-16, Surkhan-18, Termez-202, Surkhan-103 and Surkhan-104.

RESULTS AND DISCUSSIONS

Phenological observations of the flowering process in varieties were carried out research (14.06.2021, 23.06.2021). The study of the flowering process in cotton was carried out daily for 10 days, in the morning.

In our study, the intensity of the flowering process was high in the period from June 19 to June 23, relatively low in the period from June 16 to June 18, and in the period from June 14 to June 15, the intensity of the flowering process was low (Table 1).

The obtained 10-day flowering process according to the results of phenological observations shows that the cotton varieties Surkhan-18, Termez-202 and Surkhan-103 have a higher flowering time than the varieties Surkhan-104 and Surkhan-16, especially high flowering intensity is observed in the variety Termez-202 (Fig.1).

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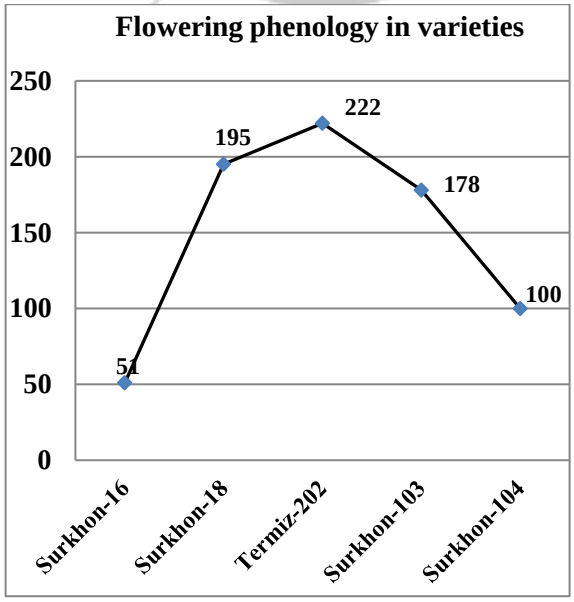
Table 1
Phenology of the flowering process in fine-fiber cotton varieties

№	Varieties	Flowering phenology									
		14.06.2021	15.06.2021	16.06.2021	17.06.2021	18.06.2021	19.06.2021	20.06.2021	21.06.2021	22.06.2021	23.06.2021
1	Surkhan-16	-	-	-	1	7	7	1	14	7	14
2	Surkhan-18	2	10	11	27	14	34	12	32	27	26
3	Termez-202	-	1	10	15	19	46	28	33	38	32
4	Surkhan-103	9	16	22	19	8	37	11	18	20	18
5	Surkhan-104	1	4	3	4	10	12	5	22	12	20

Analyzing the phenology of flowering in the context of varieties, it can be seen that the Termez-202 variety has a higher flowering intensity compared to other varieties, from the moment of sowing seeds until June 23, that is, 222 flowers were opened with an interval of 48 days.

In the remaining varieties, that is, in the varieties Surkhan-103, Surkhan-18, Surkhan-195, Surkhan-104, 100 and Surkhan-16, more than 51 flowers were revealed. As can be seen from the results of the table, the lowest rate of flowering intensity was observed in the variety Surkhan-16 (Figure 1).



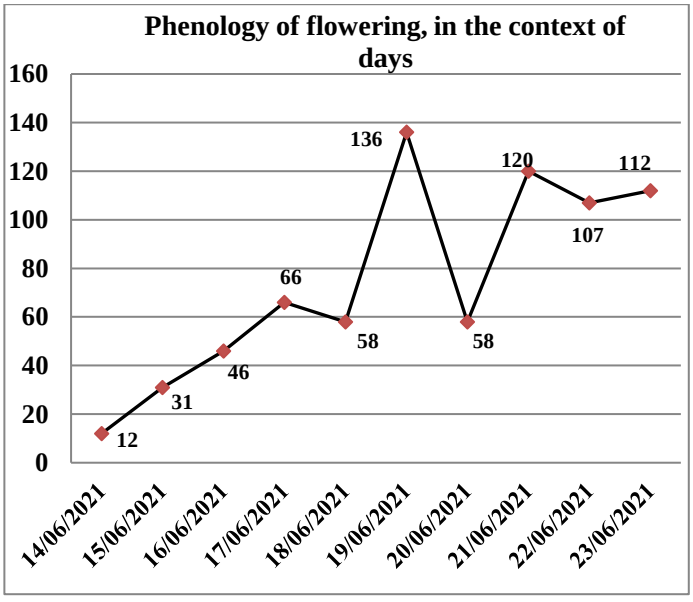


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Figure 1. Phenology of flowering in varieties

Figure 2. Phenology of flowering by day

When analyzing the phenology of flowering in the context of days, the following indicators appeared. According to the results of the analysis, based on 10-day (June 14 - June 23) phenological observations, starting from the date of sowing seeds (05.05.2021), the indicator of flowering intensity on June 14 (38 days) is the lowest of 12, and the highest indicator of flowering intensity is observed on June 19 (43 days) and is 136 we can see that the flower has opened (Fig. 2).

The intensity of flowering in 46-48 days (from June 21 to 23) was determined in experiments that 107 flowers were opened, and up to 120 flowers. From June 14 to 16 (with an interval of 38-40 days), the indicator was low, and it was noticed that from 12 to 46 flowers were opened.

In the course of the research, varieties specific to the species G. hirsutum L. and G. barbadense L. were crossed. New hybrids were obtained, and seeds of hybrid combinations were planted in field conditions with the parent forms and maintained under the same conditions. Phenological observations and analysis were carried out. If we pay attention, there is a big difference between the medium and thin fiber varieties involved in hybridization, and among them it is necessary to include the type of branching. G. hirsutum L. cultivars participating in the maternal form belong to SP-1303, Baraka, ATM-1 and T-91/21 ridges of the I-II branching type, while G. barbadense L. cultivars participating in paternity belong to Surkhan-14 and Surkhan- 9 varieties are varieties with a limited branching type, and the crop elements are attached to the main stem. This was also confirmed in the conducted experiments.

Another important morphological indicator is the shape and color of pods. In hybrid plants, the inheritance of G. hirsutum L. varieties with intermediate or high indicator of pod size was determined, but in some combinations, the superiority of G. barbadense L. varieties in pod structure was noticed. In some combinations, the dominance of G. hirsutum L. varieties was observed. In other words, it was observed that in hybrid plants, the shape of pods was relatively elongated or pointed, corresponding to that of Surkhan-14 and Surkhan-9 varieties, while in some hybrids, it was found that there are plants with a pod shape close to the maternal shape or relatively different. In addition, it was determined that the surface of the pods was relatively rough, and the color of the pods was dark green, which indicated the superiority of G. barbadense L. varieties. In Baraka x Surkhan-9 hybrid combination, it was found out that the pods are relatively smooth and the color is lighter green. Also, in this hybrid combination, it was found

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that in the F2 generation there are plants with a different shape of the pods from the parental forms (Figure 3).

So, in the inheritance of pod shape and color, in the F1 hybrid combinations involving G. hirsutum L. and G. barbadense L. species, the dominance of the parental form with more intermediate and high indices in pod size was determined, and the superiority of G. barbadense L. varieties in the inheritance of pod shape and color were observed.

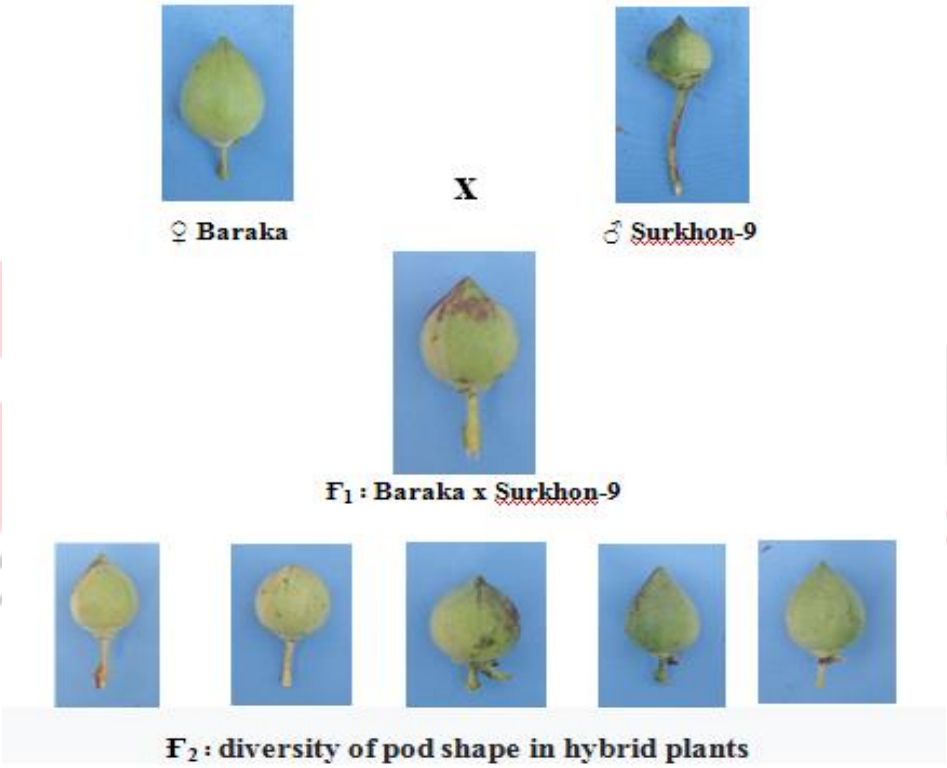

Figure 3. Inheritance of pod shape in parental and F_1, F_2 generation plants

Another distinguishing feature is the color of the petals, pollen color and the presence of anthocyanin spots on the petals. It was found that the varieties belonging to the G. hirsutum L. species involved in hybridization have white and pale yellow petals and yellow pollen, while the varieties of G. barbadense L. have yellow petals and orange pollen. The yellow petals of the hybrid combinations with their participation were large and relatively yellow, corresponding to the varieties of G. barbadense L.

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Furthermore, in the Baraka x Surkhan-9 hybrid combination, it was found that the color of petals and pollen, the absence of anthocyanin spots on petals, is based on the dominance of the maternal form (Figure 4).

Figure 2. On the left is a flower of the maternal plant, on the right is a flower of the paternal plant, and in the middle is a flower of the F_1 hybrid plant.

In the hybrid plants obtained with the presence of other varieties of the G. hirsutum L. species that participated in the hybridization, it was observed that the color of the pollen is light yellow or orange, and the absence or partial presence of anthocyanin spots on petals.

CONCLUSIONS

In conclusion, we can say that one of the signs that affect the indicators of valuable agricultural traits in cotton is the intensity of flowering. Based on the obtained result, in the varieties Surkhan-18, Termez-202 and Surkhan-103 there is an opportunity to continue genetic and breeding processes in the conditions of the Syrdarya region and use these varieties to create hybrid organisms.

Based on the experiment, intermediate inheritance was observed in the F1 generation obtained from interspecies hybridization in terms of the shape of the pod, while F2 hybrid plants showed that a plant with a different shape can be formed, according to Mendel's law of independent assortment. Also, depending on the combinations, it was determined that the trait is inherited based on the superiority of the Baraka variety, which is the maternal form, in the combination of F1 Baraka x Surkhan-9 hybrid in the colour of petals and pollen, the absence of anthocyanin spots on petals.

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