Asian Journal of Research № 7-9, 2020 ISSN 2433-202x
IMPACT FACTOR JOURNAL DOI 10.37057/2433-202x
SJIF 6,1 www.journalofresearch.asia
IFS 3,7 info@journalofresearch.asia

CHARACTER OF INHERITANCE AND VARIABILITY OF LENGTH OF A FIBRE AT HYBRIDS F_1-F_3 IN THE CONDITIONS OF RIGID WATER DEFICIENCY (0-1-0)

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http://dx.doi.org/10.37057/2433-202x
Issue DOI http://dx.doi.org/10.37057/2433-202x-209-2020-7-9
Article DOI http://dx.doi.org/10.37057/2433-202x-2020-7-9-3

Abstract

In this article results of researches on cotton lines received by composite hybridization and their participation of F_1 -F_3 hybrids the study in rigid water deficiency are analyzed. It has been revealed that ridges involved in experiments can serve as a starting point not only for high yields on rigid water deficiency but also initial material for production of quality fiber.

Keywords: Cotton, hybrids, salinity, variability, donors, lines, inheritance, generation, recombinant, variety.

Introduction

The article is devoted to study specificity inheritance fiber length, under conditions of water deficit.

To present time there were no data in our literature about a role of new samples wild and ruderal species that were grown up in arid zones of Mexico possessing by number of valuable indicators [1] with their use in hybridization in particular and on length of a fiber, we have decided to take up this question in our researches having studied character of inheritance and variability [2] of a fiber length in hybrids.

The problem of water scarcity and salinization is now becoming of paramount importance due to climate change in the Central Asian region, which leads to a reduction in water resources and an increase the saline soils. In this connection, there was an urgent need to develop varieties resistant to these stress factors. For these purposes, the entire genus *Gossypium*, and in particular the species *G.hirsutum* L., is not fully understood in terms of its possible use in connection with the problem of water deficiency and salinity. The goal of the research is to develop cotton varieties that are comprehensively resistant to salinization and water deficiency through the

use of wild and ruderal varieties of the species *G.hirsutum* L.

Material and methods of researches

The research is aimed at developing cotton varieties that are comprehensively resistant to salinization and water deficiency using the extensive genomic-based breeding and water-salinity research lines develop by the CBCPARI laboratory on an extensive genomic basis. They were obtained on the basis of studying the global gene pool, taking into account, from the standpoint of adaptive selection, the genetic diversity expressed by various levels of resistance in conditions of water deficiency, salinization of wilt and healthy backgrounds, which made it possible to identify new sources of germplasm (*ssp. Yucatanense, punctatum, morilli, richmondi, m .galante, brasiliense, G.thurberi, G.raimondi* and others) are resistant to the studied stress factor. At the same time, hybridization was performed on linear material (F_{17}), where the best varieties of the American Acala 1517-70, Acala Sj1, Acala Sj5, Deltapine 16, Paymaster 266, Delcot 277, 06, 045, 0225, 0226, Selection Compositae and domestic selection: S -9070, Tashkent-1, S-6524, 108-F, 149-F, Namangan-77 and the above species and varieties. The entire breeding process took place on 3 backgrounds in parallel: - a severe water deficit (0-1-0) in the CBCPARI Tash. reg. with (8-10 m) depth, occurrence of groundwater, salinization - branch - Syrdarya region. (0-1-0) with a depth of groundwater of 1.5-2.0 m, and a normal background of growing (1-2-1) – CBCPARI. The experiments were conducted replications in 3x repetition. Standard varieties used as control varieties S-6524, An-Bayaut-2.

The focus of the research was on combining the high potential productivity and early maturity of the new varieties with the ability to withstand the effects of abiotic and biotic factors.

The solution to the scientific problem is based on previously developed methods for imoraving cotton varieties and lines resistant to water deficiency and salinization on a new genomic basis.

Results of researches

So studying of character of inheritance of length of a fibre in our researches on hybrids F_1 and F_2 has shown that all initial lines which have been grown up in the conditions of water deficiency, possess high indicators of length of a fibre (1.18-1.24 inches). Therefore hybridization with them has given indicators in 1.18-1.27 inches. Also that is important, there was no case of display negative heterosis. The difference in degree of expression of a sign depended on a combination of crossing and a genotype of initial forms. In 3 cases from 11 - display heterosis when the indicator hp^1 has made - 2.3 took place; 17.0; 2.0. Thus the length of a fibre has made 1.24; 1.27dime that leaves for values of the fourth type of a fibre. It was sometimes observed partial domination (4 ivents) with values 1.19-1.24 inches. In single instances (3), inheritance went as the parent, with lower indicator (hp^1-1.0). (heterosis) we had Good results, when as the parent form the line (Acala 1517-70 x m.galante) in three hybrids with the given initial form (1.19 acted; 1.24; 1.27 inches). And also with a hybrid line (paumaster-266 x punctatum) - 1.24 inches.

The behavior of these hybrids in F_2 generation when we had indicators within values, as at hybrids F_1 (1.17-1.24 inches) was of interest, heterosis at values of 1.19-1.23 inches we had preservation in combinations when the line (Acala 1517-70 x m.galante was the parent form) where heritability has made hp^2-from 0.01. We had a similar indicator of heritability at participation in quality of the parent form - lines (deltapine-16 x morilli) x (paumaster-266 x richmondi). In these combinations, ruderal the forms participating in hybridization, had fibre length 30.0-32.2 мм.

Other polymorphic hybrids had the values close mostly to the worst parent (it we in our case name as a worst), and these are values of 1.17-1.19 inches. When heritability has been expressed in values hp^2-0.01-0.05.

The degree of dominance of fiber length (in) hybrids F_1, F_2 as compared to parental forms when grown in a hard water deficit (0-1-0)

Hybrid combinations	F_1	hp	F_2	S	V	h^2	P_1	P_2
(Acala 1517-70 x m.galante) x [And.60 x (108F x S-9070)]	1,24±0,01	2,3	1,24±0,01	1,99	3,17	0,04	1,30	1,22
(Acala 1517-70 x m.galante) x [(Deltapine 16 x Morilli) x (Paumaster-266 x Richmondi)]	1,27±0,01	17,0	1,23+0,03	2,42	2,27	0,03	1,19	1,18
(Acala 1517-70 x m.galante) x [(Paumaster-266 yucatanense) x (Deltapine 16 x Richmondi) x (Paumaster-266 x Richmondi)]	1,19±0,02	0,0	1,19±0,02	2,82	2,28	0,01	1,19	1,18
(Deltapine 16 x Morilli) x [(Paumaster-266 x Richmondi) x (Acala 1517-70 x m.galante)]	1,19±0,01	0,0	1,20±0,02	2,87	2,45	0,02	1,19	1,19
(Deltapine 16 x Morilli) x [(Paumaster-266 x Richmondi) x (108F x S-9070) x (Deltapine 16 x Morilli)]	1,18±0,02	-1,0	1,20±0,03	3,01	3,24	0,01	1,18	1,22
(Deltapine 16 x Morilli) x [(Paumaster-266 x Richmondi) x (108F x S-9070) x (Namangan 77 x (Paumaster-266 x Punctatum)]	1,21±0,02	0,5	1,20±0,01	1,79	1,62	-0,01	1,18	1,22
(Deltapine 16 x Morilli) x [(Paumaster-266 x Richmondi) x (Yucatanense x Punctatum)]	1,18±0,01	-1,0	1,19±0,02	2,19	2,82	-0,01	1,18	1,22
(Yucatanense x Punctatum) x [(Namangan 77 x (Deltapine 16 x Morilli) x (Paumaster-266 x Richmondi)]	1,18±0,01	-1,0	1,17+0,03	3,81	3,69	-0,04	1,22	1,18
(Paumaster-266 x Punctatum) x [(Paumaster-266 x Punctatum) x 0226)]	1,24±0,01	2,0	1,20±0,02	3,74	3,49	-0,02	1,22	1,28
Shortcat x [(Deltapine 16 x Morilii) x (Paumaster-266 x Richmondi)]	1,21±0,02	0,0	1,18±0,01	3,97	3,82	-0,05	1,24	1,18
Shortcat x (Yucatanense x Punctatum)	1,23+0,02	0,0	1,21+0,01	3,40	3,11	-0,03	1,24	1,22

For hybrids F_3 also very long fibre of 1.18-1.26 inches (lll-IV tupe) has been

noted. Frequency of detection long fibered hybrids in F_3 was above when lines participated in crossing and cultivars with high indicators to this trail. It is noticed that if in F_2 the variation factor made only V%-1.56- 2.15, in F_3 it was already V%-1.66-10.45. Forms with high factor of a variation of variability kept within at 10-11 classes. And variability (table 3.3.6.2.) Which kept within 3 classes, the variation factor made V% 2.6. Combinations concerned them [(deltapine-16 x morilli) x (paumaster-266 x richmondi)] x [Namangan-77 x (deltapine-16 x morilli) x (paumaster-266 x richmondi)] and two with a grade (shortcat x (yucatanense x punctatum)), shortcat x [(deltapine-16 x morilli) x (paumaster-266 x richmondi)]. At the same time there were combinations very narrow V%-1.52-1.56 factor of a variation. Number of classes here was still already. It has been displaced strongly in the right party with prevalence of long-staple forms. This results from the fact that initial forms possess high indicators which allow them to be shown with so high values.

Genotypes with high values 1.25-1.28 inches are shown among hybrids F_3(Acala-1517-70 x m. galante) x [Andizhan-60 x (108-F x S-9070)], (Acala1517-70 x m.galante) x [(deltapine-16 x morilli) x (paumaster-266 x richmondi)]. There, where participates in quality of a parent line (Acala 1517-70 x m.galante), and in them participate initial forms which possess the highest length of a fibre, we receive donors on all parameters of quality.

The reason of high length of a fibre in F_2 and F_3 is a consequence wide recombigenesis.

Given results testify to huge genetic potential hybridgenetics the forms which realization allows to allocate recombination's which possess a combination of a high exit of a fibre and lengths of a fibre simultaneously, having microneir 3.8-4.0 with specific explosive loading to 31.5-33.0 g/s teks. Decrease in factor of a variation in some combinations and reduction of factor of variability specify on these indicators in earlier generations. It has not been noted high amplitude of fluctuation with high factor of a variation, within studied combinations. Even cases negative heterosis in F_2give in absolute values indicators 1.21dime.

Conclusions

Proceeding from the received data, it is possible to draw following conclusions:

- Cultivation of polymorphic hybrids, in the conditions of the water deficiency, studied into the account of use of lines with high levels of expressiveness of a trait of length of a fibre, high values of an indicator of length of a fibre allow to receive in F_1 And even F_2 F_3 generation that assumes their further preservation in the subsequent generations with standard requirements of IV type, and even exceeding it.

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