

# Of Valuable Agricultural Characters In F<sub>1</sub> Plants Of Medium Fiber Cotton Gen Collection Lines

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**Abstract.** In the article Inheritance of valuable husbandry traits was determined in F<sub>1</sub> plants of medium fiber cotton gene collection lines .

**Keywords:** combination, polyploidy, introgressive line, recombinant, experimental mutagenesis, correlative linkage

**Introduction :** Cotton has been cultivated for thousands of years mainly for its fiber and has undergone a long process of natural and artificial selection. One of the important indicators of cotton fiber is its length, yield, index and 1000 seed weight and other characteristics.

**Relevance of the topic.** Today, cotton ( *Gossypium* L.), which is one of the main branches of agriculture in the world, is being paid special attention to increase the quality of valuable economic traits, especially the fiber quality, and to improve the efficiency of their genetic potential with initial sources that are genetically resistant to various stress factors, diseases and pests. One of the urgent issues is the expansion of the priority directions for the perspective of cotton production and the creation of productive cotton varieties that are competitive in the world and have high fiber quality.

Therefore, it is important to study the inheritance of valuable economic traits in cotton gene collection lines and to create and establish resources.

Fiber length and fiber output is a quantitative trait, which appears under the influence of polygenic genes and is also significantly influenced by external factors. According to the data, the inheritance of the long fiber trait in F<sub>1</sub> hybrids was observed mainly in dominant, super-dominant and intermediate states. [3]. The ratio of fiber weight to raw cotton weight depends on the amount and weight of fibers in the seed. [2]. In the inheritance of the fiber index, the high fiber index is completely dominant over the low fiber index, when the high fiber index lines with relatively the same indicators are crossed, the trait increases in F<sub>1</sub> compared to the parental indicators . One of the main economic indicators of the productivity of cotton, which has an intermediate position compared to the parent forms, is the weight of 1000 seeds. High-quality and large-sized seeds can be grown under favorable agrotechnical conditions

**The substance of the matter.** According to the statistical analysis of the results, L-489 and L-608 lines had the highest average indicators of fiber yield ( $41.8 \pm 0.3\%$ ,  $40.8 \pm 0.2$ , respectively) and were reliably distinguished from each other. The remaining 3 lines L-4112, L-620, and L-39 had the lowest fiber output ( $35.9 \pm 0.1$ ,  $35.3 \pm 0.5$ ,  $35.5 \pm 0.2$ , respectively), and these lines did not differ statistically according to the average index. (table)

1 L-489xL-4112 combination , obtained by crossing the high fiber yield lines L-489 and L-608 with the low fiber yield line L-4112, the fiber yield was  $43.8 \pm 0.2\%$ , the positive heterosis was 104.8% , and the character is in a state of extreme superiority ( $hp=1.7$ ), respectively, In the combination of F<sub>1</sub> L-608xL-4112, it was  $36.9 \pm 0.3\%$ , and the low paternal form was inherited in the incomplete column ( $hp=-0.59$ ) state of the L-4112 line. In the F<sub>1</sub> L-489xL-39 combination , which was crossed with high fiber yield lines L-489 and L-608 and low fiber yield line L-39, the fiber yield was  $44.3 \pm 0.18$ , the positive heterosis was 106.0% , and the sign in the case of extreme superiority ( $hp=1.9$ ), In the F<sub>1</sub> L-608xL-39 combination, it was  $37.1 \pm 0.3\%$ , and the low-index paternal form was inherited in the incomplete column ( $hp=-0.68$ ) state of the L-39 line. In the combination F<sub>1</sub> L-489xL-620 obtained by crossing the L-489 line with a high fiber yield and the L-620 line with a low fiber yield, the fiber yield was  $44.2 \pm 0.2\%$ , the positive heterosis was 105.7%, and the trait was extremely dominant (  $hp=1.7$ ) was inherited.

L-489xL-608, which was crossed with L-489 and L-608 lines with high fiber yield, the fiber yield was  $46.4 \pm 0.2\%$ , and the strong positive heterosis was  $111.0\%$ , respectively, the sign is extremely dominant ( $hp=10.2$ ) was carried out. In the combination of  $F_1$  L-4112xL-39, obtained by crossing L-4112 and L-620 lines with low fiber yield, the fiber yield is  $36.9 \pm 0.3\%$ , and the character is in the state of extreme superiority ( $hp=2.7$ ). In the combination of  $F_1$  L-608xL-39, it was  $37 \pm 0.37\%$  and it was inherited in the state of extreme advantage ( $hp=2.2$ ).

Also, in the combination of L-4112 and L-620 lines with low fiber yield and L-39 line,  $F_1$  L-4112xL-39 combination, fiber yield is  $36.9 \pm 0.3\%$ , and in the case of extreme dominance ( $hp=2.7$ ),  $F_1$  L In the combination of L-608xL-39, it was inherited in the state of extreme advantage ( $hp=2.2$ ), making  $37 \pm 0.37\%$ .

According to the statistical analysis of the results of our experiment on the study of fiber length, the L-4112 line had the highest average value ( $37.3 \pm 0.2$ mm), the L-489 line had the lowest value ( $27.7 \pm 0.2$ mm), and the L-608 line had the lowest value ( $27.7 \pm 0.2$ mm)., and in L-39 and L-620 lines, the fiber length was  $35.4 \pm 0.1$ mm,  $35.5 \pm 0.2$ mm and  $33.7 \pm 0.1$ mm, respectively. L-608 and L-39 lines were not statistically different from each other in terms of average fiber length. In the  $F_1$  L-489 x L-4112 combination, which was crossed with the shortest fiber length L-489 line and the longest fiber L-4112 line, the average index was  $34.1 \pm 0.2$ mm, indicating incomplete dominance of the L-4112 line with the highest index. ( $hp=0.4$ ) was inherited

$F_1$  L-608xL-4112 obtained by crossing the L-608 line with an average fiber length and the L-4112 line with a high fiber length, the fiber length was  $35.5 \pm 0.22$ mm, and the trait was inherited in a negative superdominant state ( $hp=-1.1$ ).

**Valuable in  $F_1$  plants of cotton gene collection lines  
 heredity of traits of husbandry**

Lines	Fiber output	hp	Fiber length	hp	Fiber index	hp	1000 The seed weight	hp
L-489	$41.8 \pm 0.25$		$27.7 \pm 0.2$		$8.79 \pm 0.11$		$134.1 \pm 0.8$	
L-608	$40.8 \pm 0.15$		$35.4 \pm 0.1$		$7.22 \pm 0.07$		$110.1 \pm 0.7$	
L-620	$35.3 \pm 0.49$		$33.7 \pm 0.1$		$6.68 \pm 0.05$		$110.7 \pm 0.5$	
L-4112	$35.9 \pm 0.14$		$37.3 \pm 0.2$		$6.52 \pm 0.06$		$120.1 \pm 0.6$	
L-39	$35.5 \pm 0.23$		$35.5 \pm 0.2$		$7.31 \pm 0.07$		$112.3 \pm 0.9$	
$F_1$ L-489xL-608	$46.4 \pm 0.2$	10.2	$31.8 \pm 0.2$	0.1	$9.58 \pm 0.06$	2.1	$110.2 \pm 0.7$	-1.0
$F_1$ L-489xL-620	$44.2 \pm 0.2$	1.7	$33.4 \pm 0.4$	0.9	$9.23 \pm 0.07$	0.4	$115.5 \pm 0.8$	-0.6
$F_1$ L-489xL-4112	$43.8 \pm 0.2$	1.7	$34.1 \pm 0.2$	0.4	$8.8 \pm 0.08$	1.0	$113.1 \pm 1.0$	-2.0
$F_1$ L-608xL-4112	$36.9 \pm 0.3$	-0.6	$35.5 \pm 0.2$	-1.3	$6.39 \pm 0.07$	1.4	$110.58 \pm 0.9$	-0.9
$F_1$ L-4112 x L-39	$36.9 \pm 0.3$	2.7	$36.2 \pm 0.2$	-0.1	$6.56 \pm 0.08$	-0.9	$111.75 \pm 0.9$	-1.1
$F_1$ L-608 x L-39	$37.1 \pm 0.3$	-0.7	$34.6 \pm 0.2$	-0.5	$6.51 \pm 0.09$	-19.0	$110.4 \pm 1.3$	-0.7
$F_1$ L-489 x L-39	$44.3 \pm 0.2$	1.9	$34.9 \pm 0.3$	0.9	$8.7 \pm 0.09$	0.9	$109.4 \pm 0.8$	-1.3
$F_1$ L-620 x L-39	$37 \pm 0.3$	2.2	$36.7 \pm 0.3$	2.3	$6.81 \pm 0.10$	-0.6	$115.4 \pm 1.1$	4.9

In the combination of  $F_1$  L-4112xL-39 obtained by crossing the L-4112 line with a high fiber length and the L-39 line with an average fiber length, the fiber length is  $36.2 \pm 0.2$ mm, and the sign is a negative incomplete advantage of the L-39 line with a relatively low index ( $hp=-0.1$ ) was inherited.

$F_1$  L-489xL-39 and  $F_1$  L-489xL-620 obtained from L-608, L-39 and L-620 lines with medium fiber length with L-489 line with short fiber length the length is  $31.8 \pm 0.2$  mm,  $34.9 \pm 0.3$ mm and  $33.4 \pm 0.35$ mm, the character was inherited in the case of incomplete dominance of lines with a relatively high index ( $hp=0.1$  and  $hp=0.9$ ).

the mutual  $F_1$  L-608xL-39 combination of L-608 and L-39 lines with an average fiber length, the fiber length was  $34.6 \pm 0.2$  mm, and the character was inherited in the case of incomplete dominance ( $hp=-0.45$ ) of the L-608 line with a relatively low index.

$F_1$  L-620xL-39 combination of the L-620 line with a lower fiber length indicator and the L-39 line with an average fiber length, the fiber length was  $36.7 \pm 0.3$ mm, and the trait was inherited in the state of positive superdominance ( $hp=2.3$ ).

$F_1$  generation hybrids obtained from their crossbreeding were taken as research objects. According to the statistical analysis of the results, L-489 line has the highest indicator ( $8.8 \pm 0.1$ g), L-4112 and L-620 lines have the lowest indicator ( $6.5 \pm 0.1\%$  and  $6.7 \pm 0.1$ g), while L- In lines 39 and L-608, the fiber index had an average value of  $7.20 \pm 0.01$ g and  $7.3 \pm 0.1$ g, respectively.

$F_1$  L-489xL-4112 combination of the L-489 line with a high fiber index and the L-4112 line with a low fiber index, the average index was  $8.8 \pm 0.1$ g, indicating the complete superiority of the high-index L-489 line ( $hp=1.0$ ) was inherited

$F_1$  L-489xL- 620 obtained by crossing the L-489 line with a high fiber index and the L-620 line with a low fiber index, the fiber index was  $9.2 \pm 0.1$ g, and the positive heterosis was 105.0%. and the trait was inherited in a positive superdominant state ( $hp=1.4$ ).

$F_1$  L-489xL-39 obtained by crossing the L-489 line with a high fiber index and the L-39 line with a relatively low fiber index, the fiber index is  $8.7 \pm 0.1$ g, indicating incomplete superiority of the L-489 line with a high index. ( $hp=0.9$ ) was inherited.

$F_1$  L-489xL-608 combination, which was crossed with the L-489 line with a high fiber index and the L-608 line with a relatively average fiber index, the fiber index was  $9.58 \pm 0.06$ g, the positive heterosis was 109.4%, and the sign was positive. It was inherited in a state of extreme dominance ( $hp=2.1$ ).

the combination of L-4112 line L-4112 with a low fiber index and L-39 line with a relatively average fiber index,  $F_1$  L-4112xL-39 was  $6.6 \pm 0.1$ g, indicating incomplete dominance of the L-4112 line with a relatively low index ( $hp=-0.9$ ) was inherited.

$F_1$  L-608xL- 4112, which was crossed with the L-608 line with an average fiber index and the L-4112 line with a low fiber index, the average index was  $6.39 \pm 0.07$ g, and the character was inherited in the negative superdominance ( $hp=-1.4$ ).

$F_1$  L-620xL-39, which was crossed with the L-620 line with a low fiber index and the L- 39 line with a relatively average fiber index, was  $6.8 \pm 0.1$ g, indicating incomplete dominance of the L-620 line with a relatively low index ( $hp=-0.61$ ) was inherited

$F_1$  L-608xL-39 combination crossed with the L-608 and L-39 lines was  $6.51 \pm 0.09$ g, and the character was inherited in the state of negative extreme dominance ( $hp=-1.9$ ).

In our experiment on 1000 seed weight marker, L-489 line has the highest marker value ( $134.1 \pm 0.8$ g, respectively), while L-608, L-620 and L-39 have the lowest 1000 seed weight ( $110.1 \pm 0.8$ g, respectively).  $0.7$ gr,  $110.7 \pm 0.5$ gr and  $112.3 \pm 0.9$ gr,) and the L-4112 line had an average index of 1000 seed weight, which was  $120.1 \pm 0.6$ gr, respectively.

L-489xL-620 and  $F_1$  were obtained by crossing the L-489 line with a high index of 1000 seed weight and the L-608, L-620 and L-39 lines with a low 1000 seed weight. In the L-489xL-39 combination, the weight of 1000 seeds was  $110.2 \pm 0.7$ g,  $115.5 \pm 0.8$ g and  $109.4 \pm 0.8$ g, complete, incomplete and extreme dominance of low performance lines ( $hp=-1.0$ ,  $hp=-0.6$  and  $hp=-1.3$ ) were inherited.

$F_1$  L- 489xL-4112 combination obtained by crossing the high 1000 seed weight L-489 line with the medium 1000 seed weight L-4112 line, the 1000 seed weight was  $113.1 \pm 1$ g, and the sign was negative super dominant ( $hp=-2.0$ ) was inherited

## Conclusions and suggestions

Lines L-489 and L-608 with high index of fiber yield and their combination  $F_1$  L-489xL-608 had higher mean values of the trait compared to parental lines and showed high positive heterosis status.

$F_1$  L-489xL-620,  $G_1$  L-489xL-4112 and  $G_1$  L-489xL-39 with medium output L-620, L-4112 and L-39 lines with high output L- 489 line in the combinations, the average values of the trait were higher than the parental lines and showed a high positive heterosis condition.

In terms of fiber index, 7 rL-489 and L-608 lines and their combinations F<sub>1</sub> L-489xL-608 had higher average values of the character compared to parental lines, F<sub>1</sub> L-489xL-608 and G<sub>1</sub> L-489xL-608. Fiber index in 620 combinations was 9.58±0.06g and 9.23±.0,07 g

The above-mentioned lines and combinations indicate that they are valuable starting material for cotton selection with high fiber yield and fiber index. In particular, L-489 line can be recommended for the breeding process as a valuable source of fiber yield and fiber index markers.

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