

RESULTS OF VARIETY TESTING OF LINES CREATED ON THE BASIS OF COMPLEX HYBRIDIZATION**Mamatqodirov Jahongir Bakhtiyor ugli**

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Introduction and Results

According to the Institute's large-scale variety trial data, the indicators of the T-580/18 line were as follows (see Table 1). The plant height of the T-580/18 line reached 107 cm; although this is lower than the standard varieties, the line is still classified among the tall varieties. In terms of earliness (maturity), it matured in 116 days, demonstrating earliness by 2–5 days compared to the standards Sultan (121 days) and S-6524 (118 days), respectively. The total yield amounted to 44,6 s/ha; according to the table, this showed an advantage of 13,6–11,2 s/ha over the standard varieties S-6524 (31,0 s/ha) and Sultan (33,4 s/ha), respectively.

The weight of one boll was 6,2 g, which is 0,7–0,8 g higher relative to the standard varieties. The weight of 1000 seeds was 135 g, which is 10 g higher than S-6524 (125 g) and 15 g higher than Sultan (120 g). Regarding wilt infection, the T-580/18 line showed overall infection of 11,7% and severe infection of 6,7%, demonstrating wilt resistance compared to the standard varieties. When overall wilt infection was observed, it was 15,6% less than in the standard S-6524 (27,3%) and 7% less than Sultan (18,7%). For severe infection, 3,7% was recorded in T-580/18, which is 12,6–3,9% lower than the standard varieties.

According to Table 1, the fiber output indicator (lint percentage) amounted to 38,6%, showing values 3,7–0,9% higher than the standard varieties. The fiber yield indicator was 17,2 s/ha, demonstrating superiority of 6,4–4,6 s/ha over the standards. The fiber quality indicators were also reported to be in accordance with international standards. The micronaire index ranged between 4,8–4,2, while in the standard varieties this index was 4,6–4,8; the average micronaire value for the studied line samples 1–2 was 4,5, which indicates a positive result.

The fiber breaking strength (breaking length) in sample 1 was 32,6 g.kuch/tex and in sample 2 was 31,2 g.kuch/tex, which in this trait was equal to or higher than the standard varieties. In terms of fiber length, both samples showed superiority over the standards (1,26–1,22 inch). That is, in the tested T-580/18 line the average fiber length was 1,24 inch, while in the standard S-6524 variety it was 1,16 inch and in Sultan it was 1,14 inch.

The high fiber yield and lint percentage observed in the T-580/18 line indicate that, in its genotype, the recurrent parent ‘Omad’ contributed to the improvement of these traits. Based on yield, boll size, weight of 1000 seeds, and wilt disease resistance, the T-580/18 line can be used as initial parent material in selection-research programs. As a result of the trials, the T-580/18 line, which showed positive results in the large-scale variety testing, was recommended for state field trials.

The T-580/18 line can be used as a selection source in genetic-breeding studies for increasing yield, improving fiber quality traits, and enhancing tolerance to water deficit.

Table 1. Results of large-scale variety testing of lines (2024)

Variety / Line	Plant height (cm)	Earliness (days)		Cotton yield S/ga	St nisb %	Total S/ga	St nis %	Weight of one boll (g)	1000 seed weight (g)	Wilt infection (Overall %)	Wilt infection (Severe %)	Notes
S-6524	123	121	24,0	7,0	31,0	5,6	122	28,0	15,2			
Sultan	117	118	23,0	10,4	33,4	5,5	120	19,0	6,5			
T-580/18	110	112	36,0	150,0	8,6	122,9	44,6	143,9	6,7	130	11,7	3,5

2024 field data of lines planted in large-scale variety trials

Table 1 (continued). Fiber and quality indicators

Variety / Line	Lint %	Fiber yield S/ga	St nis %	Micronaire	Breaking strength (sample 1)	Breaking strength (sample 2)	Fiber length (sample 1)	Fiber length (sample 2)	Fiber length avg
S-6524	34,9	8,4	2,4	10,8	4,8	4,5	33,5	32,8	1,17 / 1,16
Sultan	37,7	8,7	3,9	12,6	5,1	4,8	33,2	33,9	1,16 / 1,18
T-580/18	38,6	13,9	165,5	3,3	137,5	17,2	159,3	4,8 / 4,2	35,6 / 36,2

According to the results, the lint percentage of the T-580/18 line was 38,6%, exceeding the standard varieties by 3,7–0,9%. The fiber yield was 17,2 s/ha, showing superiority of 6,4–4,6 s/ha over the standards. Fiber quality indicators met international standards. The micronaire index for samples 1–2 averaged 4,5, indicating a positive outcome. Breaking strength values (sample 1 = 32,6 g.kuch/tex;

sample 2 = 31,2 g.kuch/tex) were equal to or higher than the standards. Fiber length averaged 1,24 inch in the T-580/18 line, compared to 1,16 inch for S-6524 and 1,14 inch for Sultan.

Table 2. 2024 Economic indicators of newly sown varieties

Variety / Line	Lint %	Fiber yield (S/ga)	Micronaire	Breaking strength (g/tex)	Fiber length (inch)
Sultan	37,7	13,1	4,6	37,3	1,11
T-580/18	39,3	15,3	106.2	4,5	36,4 / 1,21
S-6524	36,5		4,4	35,2	1,12
Sulton	38,7	13,1	4,6	35,5	1,15
T-580/18	40,3	15,3	106.2	4,3	36,5 / 1,21

According to the contest variety testing laboratory data, the plant height of T-580/18 was lower than Sultan and standard S-6524, being 100 cm. Regarding earliness, this line ripened in 117 days, at the standard level and 1 day later than Sultan (117 vs 116 reported elsewhere). Yield indicators for T-580/18 on 30 September were 38,9 s/ha, which was 0,8 s/ha higher than the standard (38,1 s/ha) and 0,5 s/ha higher than Sultan (38,4 s/ha). The weight of one boll for T-580/18 was 5,9 g, which was 0,4 g heavier than the standard and 1,1 g less than Sultan.

Regarding Verticillium wilt resistance, T-580/18 showed greater tolerance compared to both standards: overall wilt infection was 4,5% for T-580/18, which is 10% less than S-6524 and 10,5% less than Sultan. In terms of severe infection, T-580/18 showed 2,3% compared to Sultan 2,5% and S-6524 7,3%.

Lint percentage is known to be a major polygenic trait. For this trait, the T-580/18 line showed high results: 39,3% lint, surpassing the standard S-6524 by 5,3% and Sultan by 1,6%. Fiber yield as of 30 September for T-580/18 was 15,3 s/ha, showing superiority over S-6524 (14,4 s/ha) and Sultan (13,1 s/ha).

Micronaire and breaking length indicators were at the standard variety level (micronaire 4,5), while breaking strength was 36,4 g.kuch/tex. Fiber length showed 1,21 inch, which was superior to both standards (S-6524 1,02 inch, Sultan 1,11 inch).

Discussion and Conclusions

Therefore, considering the superiority of the T-580/18 line across several economically important traits, it is necessary to continue trials up to state control tests. In our research, using convergent hybridization methods, valuable breeding lines were created that combined significant trait complexes of the parent varieties, exhibiting resistance to diseases and pests. Specifically, the T-580/18 line was presented for the Institute’s large-scale variety testing, T-445/18 for small-scale variety testing, and for seed multiplication. The T-580/18 line is appropriate to be used as a breeding source in genetic-selection research to improve yield and fiber quality traits.

During the multi-year research, bag barcode labeling was implemented, which is important for seed production farms and enabled the creation of a database during QR coding. Bag deciphering operations were carried out. To reduce manual labor and increase operational efficiency, plants per hill were entered into a computer system, and averages, outputs, and thinning from 1000 to 100 were processed. Both positive and negative indicators were taken into account.

Digitization of elite farm records demonstrated efficiency in rapid determination of earliness, boll weight, yield, and technological parameters. When changing agronomic practices, attention was paid to whether genetic parameters changed — e.g., effects on vegetative branching, bolling, and wilt incidence.

From the elite farm ledgers, 27 parameters including cotton sterility, calyx shape, fuzziness, vegetative branching, wilt, bolling, etc., were considered. This underscores the importance of selection and monitoring.

References

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