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GENETIC POTENTIAL OF NEW PROMISING COTTON (*GOSSYPIUM HIRSUTUM* L.) CULTIVARS IN KAZAKHSTAN

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SUMMARY

A comparative evaluation of five cotton (*Gossypium hirsutum* L.) cultivars for economically valuable traits was successful through competitive varietal testing during 2022–2024 at the Agricultural Experimental Station for Cotton and Melon Growing, Turkestan, Kazakhstan. Overall, the vegetation period lasted for 117–126 days, boll weight was about 5.8–6.1 g, seed cotton yield measured 4.17–4.57 t/ha, and the fiber yield ranged from 38.0% to 39.8%. The results revealed the promising upland cotton cultivars exceeded the standard cultivar M-4005 and proved valuable in increasing cotton productivity. According to fiber quality parameters, overall, the fiber length ranged from 33.0 to 33.4 mm, micronaire (4.6–4.8 mic), fiber breaking load (4.7–4.9 g/s), and fiber fineness metric number (5470–5520). For fiber quality traits, the promising genotypes also exceeded the standard cultivar M-4005. The fiber of the newly developed cotton cultivars could receive a type IV-V fiber classification, valued for a higher price in the world market.

Keywords: Upland cotton (*G. hirsutum* L.), cultivars, competitive varietal testing, growth period, seed cotton yield, fiber yield, micronaire

Key findings: The promising cotton (*G. hirsutum* L.) cultivars' evaluation through a competitive varietal testing program helped identify the highest-yielding cultivars with improved fiber quality traits in the Turkestan Region, Kazakhstan.

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INTRODUCTION

In Kazakhstan, the Turkestan Region is the most northern cotton-growing region, with the early onset of low temperature in autumn, and cotton does not ripen well in time. Therefore, in this area, the breeders' main task is to develop early-maturing cotton cultivars with a ripening period of 105–115 days (Makhmadjanov *et al*., 2024). In the development of principles for managing heredity and variability, conservation, and rational use of the gene pool of crop plants, particularly, cultivar development is the chief goal of scientists working with intensive selection in the field of breeding. In this process, the widely used various methods comprised the selection of parental genotypes and their hybridization (Ali *et al.,* 2020; Sharma *et al.,* 2021).

The cultivar choice is a vital decision for the effectiveness of research work, which predetermines the optimal cultivation technology. In addition, the cultivars must have ecological plasticity and stability with diverse meteorological conditions (Sagalbekov *et al.,* 2022). Climate instability and the increasing impact of biotic and abiotic factors on the crops, as well as valuable plant resources preserved in their habitats, need consideration. Moreover, the essential provision to the population of sufficient quantities of diverse and high-quality food products requires a new strategy aimed at the coordinated research of the entire chain based on the conservation of genetic resources (Bazilova *et al.,* 2023). Akhmedov (2011) reported that by conducting exploration on backgrounds—control and artificial infection with the pathogen *Thielaviopsis basicola*—it was possible to identify the cultivars and interspecific hybrids that combine high disease resistance with the desirable traits required by the breeder.

Modern genetics and breeding in various crops, including cotton, have several practically relevant fundamental and applied developments, methodological approaches, and techniques successfully applied by the breeders and seed growers (Kim, 2009; Urazaliev, 2021). In cotton breeding, one of the areas is the selection of dyed cotton, which is resistant to microorganisms. Some cultivars even suppress the growth of mold fungi with the highest bio-resistance, allowing the production of hypoallergenic and environmentally friendly textiles (Kotomenkova, 2018).

Analysis of domestic and foreign research findings indicates the colossal wealth of the gene pool of the genus *Gossypium* L. and the inexhaustibility of its genetic potential (Huang, 2021). Cotton (*G. hirsutum* L.) accounts for approximately 35% of the world's textile fiber demand. Cotton fiber is an extremely polar, elongated, and single-cell fiber originating from the epidermis of the ovule (Xu *et al.,* 2021).

Cotton breeders are continuously making efforts to identify several morphophysiological and quantitative components of the crop. These include plant height, plant shape, fruiting type, boll shape, days to 1st square, days to 1st flower, bolls/plant, boll weight, and sympodial and monopodial branches per plant directly and indirectly contributing to the increased seed cotton yield (Ballester et *al.,* 2021; Razzaq et *al.,* 2021).

However, at the same time, great importance is given to the selection and seed production of cotton and the development of new cultivars with a complex of economically useful traits. Specifically, these are early maturity, high productivity, resistance to diseases and pests, and optimal adaptive properties, characterized by a high fiber yield of 40%, and even more with a fiber length of 36 mm (Negmatov, 2008; Makhmadjanov *et al.,* 2022, 2023, 2024). The promising study aimed at the comparative evaluation of five cotton (*G. hirsutum* L.) cultivars for their economically valuable traits through a competitive varietal testing program.

MATERIALS AND METHODS

Plant material and procedure

The five newly developed upland cotton (*G. hirsutum* L.) cultivars, M-4003, M-4006, M-4017, M-4026, and M-4030, sustained cultivation to compare with the standard cultivar, M-4005. Their evaluation transpired through a competitive varietal testing program during the crop seasons of 2022–2024 at the Agricultural Experimental Station for Cotton and Melon Growing, Turkestan, Kazakhstan. The cotton-recommended production technology and inputs were successful in employment during the crop-growing season.

The climatic conditions of the Turkestan Region are sharply continental, with icy winters (-25 °C) and summers up to +45 °C. The average annual air temperature ranges from +12.5 °C to +13.0 °C in the northwestern part, while it ranges from +14.0 °C to +15 °C in the southern part. The frost-free period generally ranges from 175 to 185 days in the North and up to 235–255 days in the South. The frost-free period in the North and Northwest varies between 4050 °C and 4150 °C, with a range from 4340 °C to 4430 °C and 4620 °C to 5070 °C in the Middle and Southern regions, respectively.

An analysis of agrometeorological indicators over the past 10 years has shown that the highest precipitation was the annual averages of 183.7 and 195.6 mm in 2015, 229.2 mm in 2016, and 219.4 mm in 2024. The lowest precipitation resulted in 2018 at 16.0 mm and in 2021 at 97 mm, wherein these were the driest years. The average air temperature over the years has a distribution, as follows: the maximum temperatures compared with the long-term 14.4 °C were notable in 2015 at 16.0 °C, in 2017 at 16.2 °C, in 2022–2023 at 16.7 °C, and in 2024 at 18.0 °C (Table 1).

An assessment of the dynamics of the area of cotton crops in the Turkestan Region showed that the region's largest area of cultivation was 130,800 ha in 2017, 129,200 ha in 2018, 131,080 ha in 2019, 125,800 ha in 2020, and 126,200 ha in 2022. The smallest area under cultivation was in 2015, 2016, 2021, 2023, and 2024, at 99,200–111,400 ha, respectively. At the same time, the average annual yield in the region was the lowest in 2017 and 2023, at 2.38 and 2.43 t/ha, respectively, resulting from damage caused by a cotton shovel. High yields emerged in 2022 and 2024 at 2.83 t/ha (Figure 1).

The observations on the phenological parameters proceeded by following the Methodology of State Variety Testing of Agricultural Crops (2015). The said study progressed using the generally accepted methodology in breeding and seed production, 'Genetics, breeding, and seed production of cotton' (Simongulyan *et al.,* 1980). Analytical studies on the main economic and valuable characteristics continued on five varieties in a competitive trial, showing the selection of varieties M-4003 and M-4026 was according to the precocity of 117 days. Based on yield records, cultivars M-4006 and M-M-4017 provided seed cotton yields of 4.43–4.57 t and were distinct. The cultivars M-4017 and M-4030, with lint percentages of 39.7%–39.8%, distinguished themselves for fiber yield. From this, one can conclude that the indicators of precocity, yield, and fiber yield do not correlate with each other in any way.

RESULTS AND DISCUSSION

Past studies reported the technology of growing precocious cotton cultivars differed from traditional cultivars, since the duration of the growing season is shorter (105 to 115 days), while in local cultivars used, it was 130 to 140 days, even reaching 160 to 170 days (Bashkov, 2014). This feature of precocious cultivars enables the harvest of raw cotton before the onset of early frosts, which eventually increased the seed cotton yield with high-quality fibers (Jumabekov, 2007). The precocious cotton cultivars play an important role in the placement of cultivars under the conditions of Southern Kazakhstan. In studying the factors, interphase periods are crucial, and their duration depends on the entire growing season (Yusupov *et al.,* 2016). Previous studies documented the vital role of the variety that should be able to provide high and sustained productivity under various environmental conditions (Podolnaya *et al.,* 2015; Yusupov *et al.,* 2016).

Cotton growing is mainly for fiber, and numerous studies reported that fiber quality traits (tonin, staple, and breaking length and strength) characterize the fiber quality at

Table 1. Main agrometeorological indicators (for 10 years, 2015–2024).

Months	Precipitation (mm)												Air temperature (°C)											
	Amount per month												Amount per month											
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	perennial	deviation from perennial	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	medium-long-term	deviation from the long-term
January	48.6	46.8	62.5	12.2	32.4	16.2	45.5	47.8	23.0	38.0	32.0	5.3	-0.2	-2.7	2.7	-2.0	-1.0	-1,1	-2.1	-0.6	-8.0	3.38	-2.9	1.7
February	60.4	34.1	39.5	3.8	34.2	38.7	30.5	35.9	69.0	32.4	32.0	5.8	4.3	4.5	3.0	-0.1	2.0	2.1	3	4.5	4.8	3.03	0.6	2.5
March	36.0	86.3	20.1	0	23.4	1,1	20.1	47.8	24.0	77.5	48.0	-14.4	6.9	8.1	8.3	10.5	9.4	9.5	8.3	9.8	14.4	9.26	7.1	2,3
April	19.8	24.6	0.9	0	18.6	48.1	0.9	32.0	14.0	22.9	39.0	-20.8	16.9	14.6	13.3	13.9	13.0	14.3	13.3	14.8	17.6	17,18	14.5	0.4
May	26.4	22.6	0	0	5.0	0,0	0	15.2	8.0	46.6	21.0	-8.6	21.6	21.2	22.4	19.5	20.0	21.0	22.4	23.9	22.7	21.25	20.6	1.0
June	1,2	11.0	0.4	0	1.0	0,0	0	0,1	0,0	0.5	6.0	-4.6	26.3	25.5	25.2	24.7	24.4	25.5	24.5	26.0	28.0	28.47	24.3	1.6
July	0.2	3.0	0,005	0	0	0,0	0	0	0,0	0	2.0	-1.7	26.8	26.4	26.1	26.9	26.8	26.9	26.5	28.0	29.3	28.7	26.6	0.6
August	2,2	0,0	20.0	0	0	0,0	0	0	0,0	0	2.0	0.2	23.1	24.6	25.0	23.0	23.4	23.2	23.4	24.9	24.9	26.8	23.2	1.0
September	0.8	0.8	22.0	0	0	0.3	0	0	0	1.5	1.7	0.8	17.7	20.8	20.2	17.5	17.0	16.9	17.3	18.8	20.0	23.7	15.3	3.7
Precipitation totals and average temperatures	195.6	229.2	165.4	16.0	114.6	104.4	97	178.8	138.0	219.4	183.7	-37.9	16.0	15.8	16.2	14.8	14.9	15.3	15.2	16.7	16.7	18.0	14.4	1.6

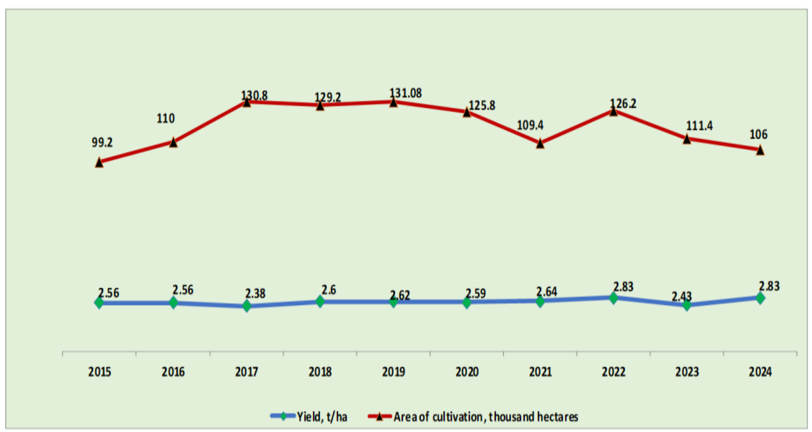

Figure 1. Sown area and cotton yield (over 10 years, 2015–2024.

harvest (Sadikov, 2021; Sadikov *et al.,* 2023). Sadikov (2025) mentioned the cotton research results depend on the number of full-fledged bolls formed on the sympodia, as well as on their mass and size. The Upper Half Mean Length (UHML) became one of the chief components of the fiber quality of cotton cultivars (Akparov *et al.,* 2021). This is the average length of the longest fibers, which make up half of the test sample by weight.

In the competitive varietal testing, the promising cultivars were evident with the following features: the number of days from sowing to 50% ripening, average boll weight, seed cotton yield, and fiber yield (Table 2). According to results, the newly developed cultivars deviate from late by +1 day to earlier by -8 days in ripening compared with the standard cultivar M-4005. In the 50% ripening phase, the early-ripening cultivars were M-4003 and M-4026, while the late-ripening cultivar was M-4030. The other two cultivars, M-4006 and M-4017, also exceeded the standard cultivar M-4005 but were slightly inferior to the promising cultivars by -4 and -5 days. Past studies reported two cultivars developed, M-4011 and Turkestan, gave seed cotton yields ranging from 3.8 to 4.5 t/ha (Yusupov *et al.,* 2016).

For average boll weight, the new cultivars had minor differences in size versus the standard cultivar, except for two cultivars, M-4006 and M-4017, whose boll weight exceeded it by +0.4 g. Nevertheless, a tendency for new cultivars to form larger bolls arose, exceeding the standard cultivar M-4005 by +0.1 to +0.2 g. For seed cotton yield, on average, the promising cultivars surpassed the standard cultivar M-4005 by +0.21 to +0.61 t/ha. Simultaneously, the cultivars can reach conditional dividing into those with a more significant yield increase from +0.4 to +0.61 t/ha for the cultivars M-4003, M-4006, and M-4017, as well as less productive ones, M-4026 and M-4030 (+0.21 to 0.29 t/ha). In general, it is noteworthy that the new, promising cotton cultivars were more productive than the standard cultivar and were definitely valuable in increasing productivity. According to the passport data, the weight of the raw material of one boll in the zoned varieties, Tashkent-6 and Omad, should be 6–6.5 and 6–7 g, respectively (Kostomarov, 2018).

The most valuable feature of the cotton plant is undoubtedly the fiber, and more precisely, the fiber yield, as the percentage of fibers separated from the seeds in the raw cotton sample. By analyzing the fiber yield, one should note that the standard cultivar M-4005 has a fairly high value (37.8%), as characterized by being a high fiber-yielding cultivar. Therefore, the result will be more valuable by comparing new, promising cultivars for fiber yield, where the promising cultivars exceeded the standard cultivar by 0.2% to 2.0% (Table 2). Notably also, an increase in fiber yield by 1%–2% is a considerable indicator, given this feature negatively correlated with yield-related traits. The highest values of fiber yield over the standard resulted from the cultivars, M-4030 and M-4017, amounting to 1.9% and 2.0%, respectively. For the other three promising cultivars, the fiber yield surpassed was by a

Table 2. Promising cotton cultivars compared with the standard cultivar for economically valuable traits evaluated through competitive varietal testing during 2022–2024.

Cultivars		Number of days from sowing to 50% maturity		Productivity (t/ha)		Average boll weight (g)		Fiber (%)	
		days	off from St	t/ha	off from St	g	off from St	%	off from St
1	St.-M-4005	125	0.0	3.96	0.0	5.7	0.0	37.8	0.0
2	M-4003	117	-8	4.36	+4.0	5.8	+0.1	38.3	+0.5
3	M-4006	120	-5	4.43	+4.7	6.1	+0.4	38.0	+0.2
4	M-4017	121	-4	4.57	+6.1	6.1	+0.4	39.8	+2.0
5	M-4026	117	-8	4.17	+2.1	5.8	+0.1	38.0	+0.2
6	M-4030	126	+1	4.25	**+**2.9	5.9	+0.2	39.7	+1.9

M = 4.27 t/ha; E = 1.1 t/ha; P = 2.6%; $LSD_{0.05}$ = 2.0.

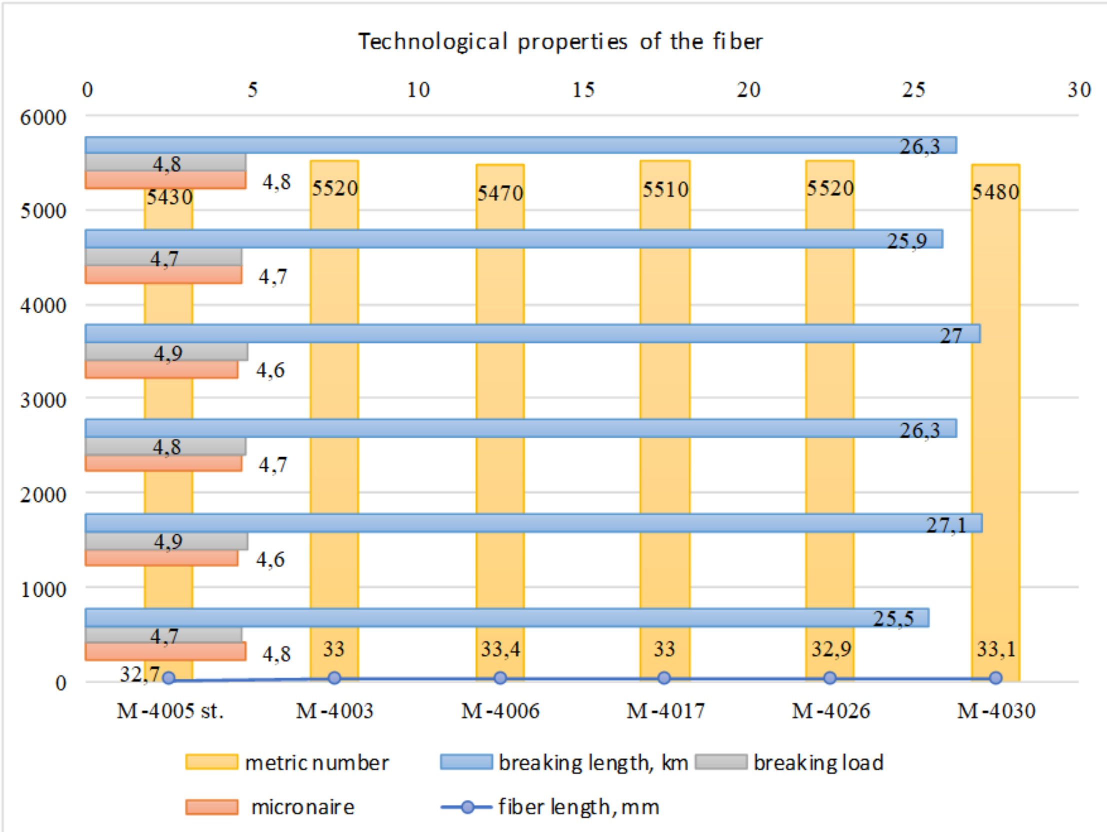

Figure 2. Promising cotton cultivars compared with the standard cultivar for fiber quality traits evaluated through competitive varietal testing during 2022–2024.

smaller amount (0.2% to 0.5%). The Agricultural Experimental Station of Cotton and Melon-Growing has developed a new, medium-fiber cotton variety, Maktaaral-5027, with a seed- cotton yield of 4.3 t ha^{-1}, fiber yield (37%–38%), and the fiber length (33.5–33.7 mm) (Makhmadjanov, 2024).

Generally, one can conclude that the promising cultivars have an increased fiber yield in combination with other yield-related traits. Thus, the cultivar M-4017 significantly exceeded the standard, emerging to be the best for a set of economically valuable traits. Among the other cultivars showing superior performance were the cultivar M-4003, leading for early maturity (-8 days) and seed cotton yield (+4.36 t/ha); M-4006 for boll weight (+4.0 g) and seed cotton yield (+4.43 t/ha); and the cultivars M-4026 and M-4030, both for early maturity (-8 days) and fiber yield (39.7%). The analysis of the economically valuable and fiber-quality traits in new, promising cotton cultivars is available as figures for greater clarity and accessibility (Table 2, Figure 2).

Vegetation period up to 50% ripening

Analysis revealed the standard cultivar M-4005 has a vegetation period before the 50% ripening of 125 days (Figure 3). In new, promising cultivars, the said trait varies from 117 days (M-4003 and M-4026) to 126 days (M-4030). Cultivars M-4006 and M-4017 stood out with relatively average values of 120–121 days before the beginning of 50% ripening. Thus, the earliest-ripening cultivars were M-4003 and M-4026, the mid-ripening were M-4006 and M-4017, and the late-ripening cultivar was M-4030, which took one day more than the standard cultivar M-4005.

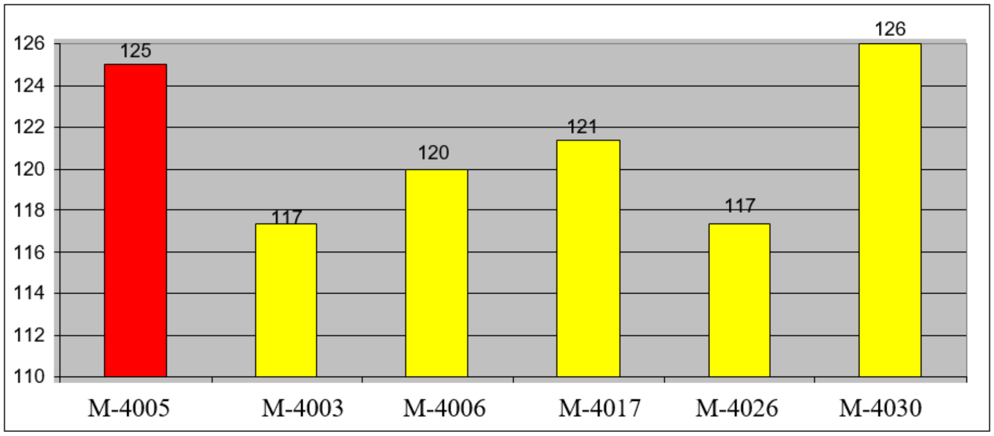

Figure 3. Promising cotton cultivars compared with the standard cultivar for vegetation period to the beginning of 50% ripening (days) evaluated through competitive varietal testing during 2022–2024.

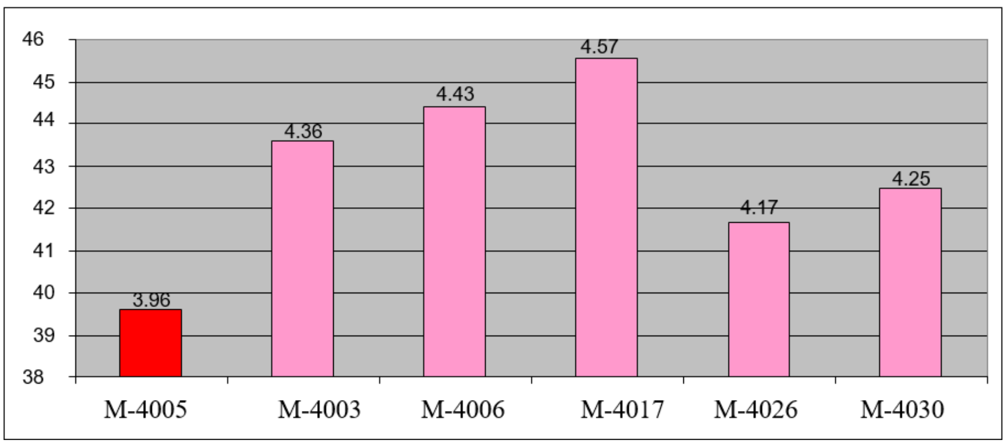

Figure 4. Promising cotton cultivars compared with the standard cultivar for seed cotton yield (t/ha) evaluated through competitive varietal testing during 2022–2024.

Boll weight

The boll weight plays a pivotal role in managing the seed cotton yield. The promising cultivars revealed nonsignificant differences for boll weight, while significant variations appeared for seed cotton yield. The standard cultivar M-4005 displayed the boll weight of 5.7 g, while the promising cultivars (M-4003, M-4026, and 4030) did not differ significantly, and the boll weight ranged from 5.8 to 5.9 g, yet still exceeded the standard cultivar. However, the two cultivars, M-4006 and M-4017, had a larger boll weight (6.1 g) and the highest seed cotton yield (Figure 3). Therefore, one can conclude that the traits boll weight and the seed cotton yield, having different values of expression, had a tendency to exceed the standard cultivar M-4005.

Seed cotton yield

The standard cultivar M-4005 had the seed cotton yield of 3.96 t/ha, while in newly developed cultivars, the yield was higher than the standard cultivar, ranging from 4.17 to 4.57 t/ha (Figure 4). In the seed cotton yield, a significant increase emerged from the cultivars M-4003, M-4006, and M-4017 (4.36, 4.43, and 4.56 t/ha, respectively). Cultivars M-

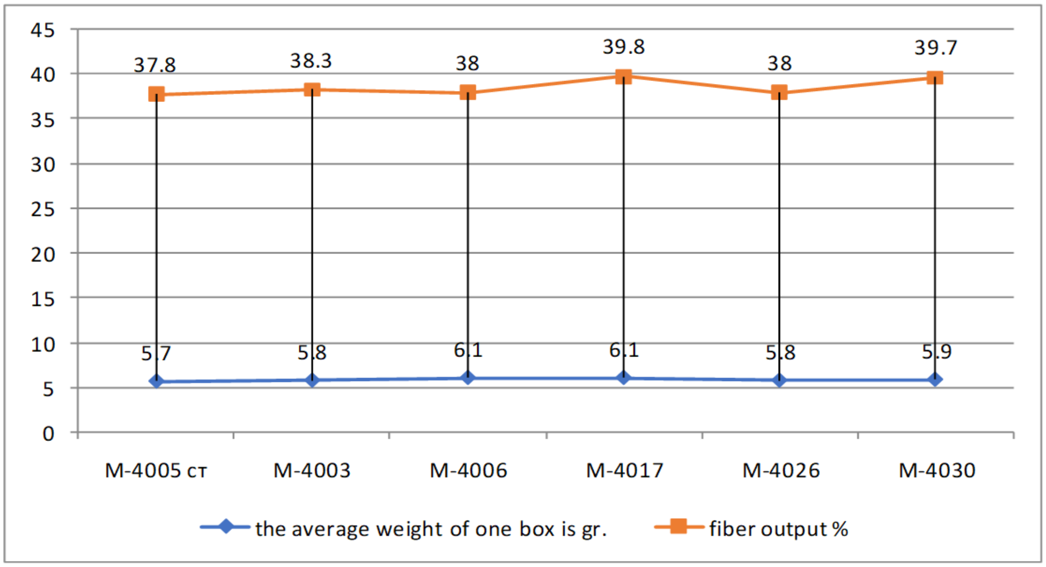

Figure 5. The relationship of fiber yield with boll weight in the promising cotton cultivars compared with the standard cultivar evaluated through competitive varietal testing during 2022–2024.

4026 (4.17 t/ha) and M-4030 (4.25 t/ha) also showed an excess in seed cotton yield over the standard cultivar; however, it was within the limits of the least significant difference ($LSD_{0.05}$ = 0.2 t/ha) (Table 2). Therefore, these cultivars were at the level of the standard cultivar, and the observed excess was unreliable. Boll weight has a direct impact on the formation of the seed cotton yield (Rao and Gopinath, 2013).

Fiber percentage

In the economically valuable traits of cotton, the fiber yield is the most important. Therefore, imposing special requirements on new cotton cultivars ensued because the main economic effect of its cultivation will depend on the fiber yield obtained after processing the raw cotton. In selecting the highest fiber-yielding cultivar, the standard cultivar M-4005 was the basis for comparison. Analysis of the fiber yield showed the standard cultivar has 37.8% fiber yield compared to three promising cultivars, M-4003 (38.3%), M-4006 (38.0%), and M-4026 (38.0%), which slightly exceeded the standard genotype (Figure 5). For fiber yield, the topmost genetic potential was evident in the promising cultivars M-4017 and M-4030 (39.8% and 39.7%, respectively).

Consequently, according to the fiber yield trait, cultivars that represent a specific commercial value in cotton cultivation surfaced. Cotton fiber must have certain properties that characterize its quality, and such properties of the fiber appear in Figure 2. Particular requirements for the quality of the fiber, such as fiber length, micronaire, fiber breaking load, fiber metric number, and fiber breaking length, are necessary. Therefore, the genetic structure of the lint percentage has both theoretical and practical significance for developing cotton cultivars with high fiber yield (Karademir *et al.,* 2010).

Fiber length

According to fiber quality properties, cotton fibers comprise category types, and the fibers from types 1 to 3 belong to the fine-fiber type of cotton with the best quality parameters. Fibers from types 4 to 7 belong to the medium-fiber type of cotton. Moreover, the medium-fiber type of cotton is the most common and in-demand from the world cotton market, considered to be type 4 (higher quality fiber) and type 5 fiber (the main basic type of fiber).

Study results indicated that the fiber length of the standard cultivar M-4005 was 32.7 mm and fully corresponded to fiber type 5 (Figure 2). The fiber length of the new, promising cultivars ranged between 32.9 and 33.4 mm and appeared longer than the standard. However, the longest fibers resulted from the cultivars M-4006 (33.4 mm) and M-4030 (33.1 mm), which can be due to the cultivars' closeness in quality to type 4. The other three cultivars did not differ significantly from each other and had a fiber length of 32.9 to 33.0 mm. Based on the data in Figure 2, the new, promising cotton cultivars have a sufficient reserve of fiber quality for fiber length and are superior for mass sowing to replace low-quality cotton cultivars. The longest fibers, making up half of the test sample by weight, exhibited typical characteristics for fibers with an upper average length of 28.0 mm (Umbetaev and Makhmadjanov, 2017).

Micronaire

Micronaire traits of the cotton fiber fineness and maturity determine the quality of the fiber according to international standards. Generally, the considered optimal value of the micronaire (Mic) ranged from 4.3 to 4.8, and the lower the value, the better the fiber quality (Figure 2). The results enunciated that the standard cultivar M-4005 has the maximum permissible micronaire value (Mic 4.8). However, a similar value was notable for the promising cultivar M-4030 (Mic 4.8). The best and equal micronaire value was evident in the cultivars M-4003 and M-4017 (Mic 4.6). For cultivars M-4006 and M-4026, the micronaire reading was Mic 4.7, which was also a good indicator. Concerning micronaire, new cotton cultivars, except for M-4030, fully comply with the international standard for fiber quality. The promising cultivar M-4030 is currently being refined for micronaire and has been identified with the desirable micronaire (Mic 4.5 to 4.6). Micronaire plays an essential role in determining the fiber quality of the cotton cultivars as per international standards (Makhkamova and Shumarova, 2017).

Fiber strength

Fiber strength is an influential indicator of fiber quality. It is the greatest force that a fiber can withstand before breaking, expressed in g/force (g.f.). The higher the parameter values, the better fiber strength a cultivar can demonstrate. The results revealed the cotton's promising cultivars have different values for fiber strength. The standard cultivar M-4005 showed the value of 4.7 g.f for fiber strength, and the same value came from the cultivar M-4026. The strongest fiber strength (4.9 g.f.) was visible in the cultivars M-4003 and M-4017. The two other cultivars, M-4006 and M-4030, showed the fiber strength of 4.8 g.f. and emerged with higher values than the standard cultivar. Overall, it was noteworthy that the new, promising cultivars have generally higher fiber strength than the standard cultivar M-4005. Fiber strength is one of the main parameters determining the fiber grade, and it is mostly dependent on weather conditions (Kelly *et al.*, 2015; Podolnaya and Khodzhaeva, 2019).

Metric fiber number

The metric fiber number (fineness) shows how many meters are in one gram of thread; that is, it expresses the length of one gram of yarn in meters (m/g). Therefore, the higher the metric number, the longer and finer the yarn. The standard cultivar M-4050 has the metric fiber number of 5430 m/g (Figure 2). However, the highest and the same metric fiber number (5520 m/g) occurred from the cultivars M-4003 and M-4026, and therefore, was remarkable with the thinnest fibers among the analyzed cultivars. The other two cultivars, M-4017 and MS-4006, have the at-par metric number (5480 and 5470 m/g, respectively). The second grade M-4030 and M-4017 were close to each other for metric fiber number, with the values of 5480 and 5510 m/g, respectively, and also appeared close to the cultivars M-4003 and M-4026. According to past studies, the metric fiber number of the considered cotton genotypes varied and ranged between 5350 and 5900 m/tex (Sadikov, 2019).

Fiber breaking length

The fiber breaking length (strength) is a complex trait equal to the product of the fiber strength and its metric fiber number. It comprised calculating the length of the fiber at which its weight is equal to the breaking strength. The calculation of the breaking length proceeded with the following equation:

$$\text{Fiber breaking load (strength)} \times \text{Metric number} = \text{Breaking length}$$

In numbers, it will be:

$$4.7 \times 5430 = 25521\,m = 25.5\ km$$
for standard grade M - 4005

The results revealed the fiber-breaking length (strength) for the standard cultivar M-4005 was 25.5 km (Figure 2). The fiber strength of the new cultivars ranged from the lowest value (25.9 km) for the cultivar M-4026 to the highest breaking length (27.0 and 27.1 km) for the cultivars M-4017 and M-4003, respectively. Relative to the analyzed cultivars, the average, as well as the same fiber-breaking length (26.3 km), was evident for the cultivars M-4006 and M-4030. The analysis indicated the new, promising cultivars have stronger fibers than the standard cultivar.

The new cultivars have a significant advantage in such main economically valuable traits as the vegetation period before the 50% ripening, seed cotton yield per hectare, and fiber yield. However, the boll weight and its size do not significantly affect the formation of seed cotton yield. New, promising cotton cultivars have a sufficient reserve for replacing cultivars with short fiber in terms of fiber length. For micronaire, new cultivars also fully comply with the requirements of the international standard for fiber quality. The new, promising cultivars have a generally higher breaking load parameter than the standard cultivar M-4005. The highest metric number also resulted from the cultivars M-4003 and M-4026, becoming considered the thinnest fiber among all the analyzed cultivars. On breaking fiber length, the new and promising cultivars have stronger fiber than the standard.

CONCLUSIONS

The cultivars M-4003 and M-4026 led to early maturity. Cultivars M-4006 and M-4017 also exceeded the standard but were slightly inferior to the former promising cultivars. The cultivar M-4003 is the best recommendation for early ripening and high productivity, with the cultivar M-4006 as productive with large bolls. The cultivar M-4026 is also early ripening, while the M-4030 was remarkable with the highest fiber yield.

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