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THE TECHNOLOGICAL PROPERTIES AND OUTPUT FIBRES IN ACCORDANCE WITH THE NORMS OF FERTILIZERS, IRRIGATION AND PLANT STAND DENSITY

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Abstract

The cotton fiber is a combination of a greatly expanded, mainly in the length of the individual cells of the outer epidermis of the skin of the seed. Quality it is characterized by complex physical and mathematical indicators and technological properties of the fiber. The main technological properties of fiber - length, maturity, breaking strength, breaking length, and other indicators. Technological properties of the fiber changes depending on the hereditary characteristics of cotton varieties, but also on the location of the boxes on the hive. Technological properties of the fiber changes depending on soil conditions and crop management cultivation.

Keyword: cotton, fiber, the norms of fertilizers, seed, ammonium nitrate, mineral fertilizers, ammonium sulfate.

With the right fertilizer can be accelerated maturation of cotton, to increase the length and tensile strength of fiber length, to increase its breaking load, increase the output, i.e. actively work on improving the quality of products. From the point of view of the requirements of the textile industry the most important characteristics of fiber quality: breaking load, maturity, length and thickness [1]. The maturity of the fiber is determined by the deposition of cellulose in the walls and is expressed as a conditional coefficients of maturity. Good fiber, this ratio is equal to 2.5 to 2.0. The breaking load is characterized by the force needed to break I stretch, and is expressed in grams force (gf). From the breaking load of the fiber to a large extent depends on the strength of yarn and fabric.

Most upland varieties of cotton fiber length varies 30-33 mm, fine 38-42 mm more length and more uniform fiber length, so it is better, stronger and smoother turns out yarn and fabric. The length of the fibers depends largely on the performance of the spinning machines. With increasing fiber length of 1 mm yarn strength increases by about 3 percent, which helps to increase productivity in spinning about 3percent.

Under linear density mean length of the fiber to its mass. Relative tensile strength of the load receiving multiplication with a linear density to measure the breaking load (gs) and dividing this works on 1000. Relative tensile load characterizes the theoretical fiber length at which it is being suspended for the first end will break [3,4].

The modern cotton varieties tensile fiber length equal 24-26 km. Under the elasticity understand the ability to stretch. Typically, the elasticity of the fiber is closely connected with his tenacity and toning. The most elastic thin fiber. It is established that the conditions of mineral nutrition of cotton can change the technological properties of the fiber. The application of complete fertilizer increases the fortress fiber, the metric number and to some extent increases the length of the fiber [2].

If nitrogen fertilizers increase the length of the fiber, phosphorus increases the strength of the fiber .The quality of the fiber and the output depends on the doses of mineral fertilizers. Best quality fiber and high yield was observed at a rate of 150 nitrogen, phosphorus 120, potassium 75 kg/ha of the active ingredient. As the reduction and the increase of the above fertilizer affect the length and the output of cotton varieties 2421 improved and one 250 kg of nitrogen, 175 kg of phosphorus, and 100 kg of potassium nutrient content not only increases yields, but also improves the main technological properties of fiber length, strength and maturity.

The use of mineral fertilizers not only increases yield but also accelerates maturation of cotton, improves grades and breaking load, increase output, length, and fiber strength. The making of ammonium nitrate was slightly increased the output fiber from bolls, taken from the first places third sympodial. Fortress fiber, metric number, maturity fiber and its breaking length was not changed. Ammonium sulfate had no significant effect on the output fiber and the weight of 1000 seeds. Ammonium form of nitrogen at joint application with insecticides increased the output fiber with 34.0 to 36.2 percent, breaking load from 4.5 to 4.7 gs. When making urea and especially insecticides, observed the increase of the mass of

1000 seeds, breaking load and breaking length of the fiberr. It is established that the shape recovery of nitrogen, especially in mixture with insecticides increases the germination of cotton seeds and improves process quality fiber.High quality fiber and larger mass seeds are formed along with nitrogen and phosphate, when making for cotton and potash fertilizers.

Making optimal doses of potassium under cotton improves the quality of cotton fiber. The strength of it when making 75 and 175 kg **K_20** was of 4.6 g fiber length 31.9-32.2 mm; breaking length of 24.6-25 km under the control of 4.5 g.s; 31,1 mm; 24.2 km respectively. The highest coefficient of maturity of the notes when making 75-175 kg/ha of potassium. Under the influence of these same doses of potassium increases slightly and the quality of the fiber. The best quality fiber is obtained at application $N_{250}P_{175}K_{75}$; the coarse fiber noted in the background making N_{250}. Increasing doses of phosphorus to 250 and potassium up to 75 kg/ha negative impact on the quality of fiber that the worst was in the variant $N_{350}P_{250}K_{75}$. Technological properties of cotton fiber, depending on the doses of fertilizers following table 1.

Tab .1.

The influence of fertilization rates on technological properties of cotton

Options	2010-2013 years.			
	The length of the fibre, мм	The breaking load, HS	Linear density (ft.room) ML (Tex)	The relative breaking length, km
Control	32,0	4,8	4900	23,6
N_{100}	32,4	4,8	4920	24,1
$N_{100}P_{100}$	32,8	4,9	4970	24,3
$N_{100}P_{100}K_{50}$	33,4	5,1	5026	24,8
$N_{150}P_{150}K_{50}$	33,6	5,2	5170	25,1
$N_{200}P_{175}K_{75}$	33,8	5,1	5196	25,4
$N_{250}P_{200}K_{75}$	34,2	5,2	5240	26,3
$N_{300}P_{250}K_{100}$	34,0	5,2	5170	25,1

As can be seen from the data presented in the tables, the fertilizer has a positive effect on technological properties of cotton fiber. Mineral fertilizers were the most significant steps in breaking load, breaking length and metric number. The best options have been making $N_{200}P_{175}K_{75}$ and $N_{250}P_{200}K_{75}$.

The output fiber is an economic indicator and determines the value of cotton varieties, the higher the output fiber, and the more valuable varieties. In practice, the output fiber is divided into 3 categories, below 30percent is considered low, 30-33 percent-average or above 33 percent - high. The upland varieties of cotton fiber output is 32-40 percent.The output of the fiber generally refers to the biological characteristics of cotton. However, research has shown that the release of fibers have a significant impact and other factors.Application of nitrogen on the background of phosphorus contributed to the increase of the output fiber. However, the percentage of output fibers grown at high levels of nitrogen and phosphorus did not differ from the optimal background. High rates of fertilizer and irrigation contribute to the reduction of the output fiber and its length; phosphate fertilizers increase the output of the fiber. Fertilizer can adjust the output fiber. Effect of nitrogen fertilizers on the yield of fiber is greater than phosphate and potash. The influence of the norms of fertilizers on the yield of cotton fiber are given in table 2. From these tables it is seen that the various provisions of the fertilizers have different impacts on output fiber. Thus, in the experiments the output fibers in the control variant by year ranged from 36 percent to 37 percent, when making Npercent, this indicator amounted to, respectively, from 36.6 to 37.4 percent. Adding to the nitrogen phosphorus 100 kg/ha dv output fiber increased from 36.8 up to 37.6 percent.

The introduction of potassium together with nitrogen and phosphorus also had a positive impact on the output fiber. The best option in both experiments was $N_{250}P_{200}K_{75}$. Increasing doses of fertilizers $N_{300}P_{250}K_{100}$ was not accompanied by increase in the percentage of output fibers. Technological properties of fibers largely depend on the conditions of mineral nutrition and cotton irrigation regime [5].

Getting fiber best quality connected with farming practices such as irrigation and fertilizer application in the correct proportions. High humidity in the growing of cotton in saline soils increases the yield and reduces the negative effect on the technological properties of cotton fibers [6]. To obtain fibers with good technological properties should not allow farms to reduce soil humidity below 65 percent HB before reaching the cotton bolls 35 days of age.

The breaking load and the length of the cotton fiber depend on the rate of fertilizer use and security of the cotton plant nutrients. The fertilizer has a positive effect on technological properties of cotton fiber. High quality fiber is obtained only when the plants are normally provided with a moisture, nitrogen, phosphorus and potassium during the growing season. From table 1 it follows that the impact of external factors on the length of the fiber is negligible. However, their effect on other indicators is very noticeable, especially on the relative breaking load. So, if 4-irrigation scheme in the background $N_{250}P_{150}K_{50}$ the breaking load was in 2011. - 4,9 gs, linear density 4920 and relative breaking load 24.1 km, at 5 irrigation scheme, these figures were respectively 5,0 gs, 5010 and 25.1 km. Fertilizer application on the background of irrigation also affected the technological properties of cotton fiber. Nitrogen fertilizer compared to phosphate and potash had a minor actions on technological properties of cotton fiber. The best option was the irrigation regime 1-4-0 (70-70-65 percent HB at the rate of fertilizer $N_{250}P_{200}K_{75}$, where the breaking load was 5.3 g, the linear density 5210 and the relative tensile strength of 26.6 km (2005). A similar trend is obtained in 2012. The output fiber is a key indicator of the production of cotton, for which cultivate this valuable technical culture. The increase in the number of irrigation for cotton increases output fiber. So, if 4 irrigations and making $N_{150}P_{150}K_{50}$ output fiber amounted in 2009 to 36.7; in 2010 - 37, 0mm; in 2011 to 36.5 in 2012 to 37.2 percent, while the increase in the number of irrigations to 5 this indicator reached respectively 37,0; 37.2; 36.8; 37,4 percent.Increased rates of nitrogen up to 200 kg/ha also contributed to the increase in the yield of cotton fibers as at 4 and 5 irrigations. The highest yield of cotton fiber obtained by making $N_{250}P_{200}K_{50}$ on the background 5 irrigations. The increase in the rate of nitrogen to 250 kg on the specified background did not cause the increase of the output fiber. Fiber is the main products of cotton, its output is of great economic importance. A significant influence on the output fiber has a density of plants. The regularities that reduce plant stand density increases, the yield of fiber and vice versa. Fertilizer increases the yield of fiber. So, if you are making $N_{200}P_{175}K_{50}$ output fiber was when the stand density 100 thousand/ha in 2009-36,8;2010-37,9; 2011-37,5; 2012-37,1 and 2013-36,9 percent, when making $N_{250}P_{200}K_{75}$ percentage of output fibers reached respectively 37,3; 38,3; 38,5; 38,3 and 37.6 percent.

Technological quality of the fiber is extremely important for the textile industry. The longer and stronger the fiber, the more and more valuable produce. The same can be said about linear density, rupture length, maturity fiber. These indicators are favorable influence of fertilizers and plant stand density. When fertilizer high standards $N_{250}P_{200}K_{75}$ slightly increase the breaking load, which is 0.2 gs compared to $N_{200}P_{175}K_{75}$ and increased staple length, although only slightly. The stand density had a certain influence on almost all the technological quality of the fiber, increased plant stand density, these figures decreased in all experiments. When the plant stand density 100 thousand/ha on the background of the 4 irrigation and $N_{200}P_{175}K_{50}$ output fiber amounted in 2009 to 37.6; in 2010-36.4; 2011-38,8; 2012-37.8 percent, respectively, when the density of 166 thousand reached to 36.6 percent, 37.4; 36,8 and 37.4 percent, respectively. When cotton magnetized water output fiber was slightly increased and amounted 38.0; 36.8; 38.8 and 38.0 [6].

Table 2.

The influence of the norms of fertilizers, irrigation and plant stand density on the output fiber and the weight of 1000 seeds

Options			The output fiber, percent				Mass of 1000 seeds, g			
The irrigation scheme	The rate of fertilizer	The plant stand density, thousand pcs/ha	2010	2011	2012	2013	2010	2011	2012	2013
1-3-0 Plain water	$N_{200}P_{175}K_{50}$	100	37,0	36,4	38,8	37,8	105,0	107,1	107,1	108,1
		160	36,6	37,4	36,8	37,4	103,0	103,6	105,3	106,3
	$N_{250}P_{200}K_{75}$	100	37,5	36,6	38,1	37,8	109,0	112,6	108,3	109,3
		160	37,0	37,5	39,0	37,6	105,0	103,5	106,4	107,4
1-3-0 Magnetized water	$N_{200}P_{175}K_{50}$	100	38,0	36,8	38,8	38,0	110,1	118,6	108,3	109,4
		160	37,5	37,7	38,7	38,0	106,0	107,5	106,3	107,3
	$N_{250}P_{200}K_{75}$	100	38,2	37,1	38,7	38,4	114,0	123,3	108,4	109,4
		160	37,9	37,7	38,7	38,3	107,0	112,6	109,1	107,6
1-4-0 Plain water	$N_{200}P_{175}K_{50}$	100	37,3	35,7	38,7	38,1	116,1	120,5	111,6	112,6
		160	37,0	37,3	37,9	38,2	111,2	110,3	113,6	110,2
	$N_{250}P_{200}K_{75}$	100	37,5	34,3	38,9	38,2	118,4	126,5	114,7	114,7
		160	37,2	34,5	38,7	38,2	113,2	116,3	112,8	112,0
1-4-0 Magnetized water	$N_{200}P_{175}K_{50}$	100	38,4	36,1	38,9	38,9	121,1	131,1	116,9	116,9
		160	38,2	37,9	37,9	38,4	114,1	120,7	113,6	112,3
	$N_{250}P_{200}K_{75}$	100	38,6	36,5	39,6	38,4	129,3	142,3	120,7	120,7
		160	38,3	37,7	39,0	38,9	102,0	121,2	117,1	116,7

As follows from the data, with increased plant stand density on I ha decreases and the output fiber. The output of the fiber at a rate of fertilizers $N_{250}P_{200}K_{75}$ increased and for years was on the background of normal irrigation water 37,5; 36,6; 38,1 and 37.6 percent and magnetized irrigation water, respectively 38,2; 37,1; 38,7 and 38.3 per cent. The maximum yield of fibers identified in option, where it was made $N_{250}P_{200}K_{75}$ with 5-magnetized irrigation water and the density of 100 thousand plants per hectare.

On the technological quality of the studied agricultural practices have a positive impact. The best performance was achieved in the variant, where it was made $N_{200}P_{175}K_{50}$ when the plant stand density 100 thousand/ha with holding 5 irrigation with magnetized water. In this embodiment, the breaking load of the fiber 5.8 g, metric number-4858, relative breaking length and 26.9 km, model length-30.7 mm, staple-32,9 mm fiber length-31-31 mm, grade fiber - selected higher and the coefficient of maturity of 2.3. Other options were intermediate [9].

Conclusions.On the yield of cotton fibers have a positive effect of irrigation regime and rate of fertilizers. The best is a 5 irrigations (1-4-0; 70-70-65 percent HB) and making $N_{200}P_{150}K_{50}$. The increase of soil water content and increased content of nutrients in the soil create favorable conditions for the growth and development of plants, provide stable yields of raw cotton.

In terms of the mil steppe to obtain high and stable yields of raw cotton with good processing properties of the fiber are required to adhere to the level of pre-irrigation moisture 70-70-65 percent HB and the annual rate of mineral fertilizers $N_{250}P_{200}K_{75}$. At low humidity (65-65-60 percent HB) annual rate fertilizers for cotton should not exceed $N_{200}P_{150}K_{50}$.Agricultural practices (fertilizers, irrigation, stand density) increases output fiber, to improve the technological quality of the fiber.

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