The Effect of Microelements on Cotton Leaf Area, Dry Mass Production and Yield

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Abstract.
This article presents the results of the study of the effect of microelements on the leaf area, dry matter formation and yield of cotton in the conditions of the gray soils of the Zarafshan Valley. The optimal rate of application of microelements had a positive effect on the leaf area and dry mass of cotton plants. The highest result was observed when $N_{250}P1_{75}K_{125}$ +KUPRUMHITE+NANOSEREBRO kg/ha was applied with mineral fertilizer.

Objectives: The aim was to change increase several physiological parameters of cotton and thereby obtain a high yield. The purpose of this was to change several physiological indicators of cotton and thereby obtain a higher yield.That is, by increasing the leaf level of cotton, it was possible to accelerate the photosynthesis process, to achieve high productivity by increasing the amount of dry mass.

Methods: All analyses, phenological observations, calculations were performed based on generally accepted methodologies [46]. The amount of dry matter was determined by L. G. Tretyakov, A. S. Sulaymonov method by drying in a drying cabinet to a constant mass, and the level of leaves was determined by N. N. Tretyakov, [45] and weighing method. Our research was conducted in the gray soils of Pastdargom district of Samarkand region in 2020-2021. We used the "Omad" variety of cotton in our research. This variety is planted in large areas in Samarkand region.

Results: In this case, the optimal rate of application of micronutrients had a positive effect on the leaf surface and dry mass formation of the cotton plant.

The highest result was observed when $N_{250}P1_{75}K_{125}$ +KUPRUMHITE+NANOSEREBRO kg/ha was applied with mineral fertilizer.

That is, the leaf area was 5285.6 cm^2, and the amount of dry matter was 135.3 g, and the yield and it was equal to 45.6 kg\.ha.

Conclusions: When using macro and microfertilizers N200P140K100+kuprumkhite+nanocerebro, the leaf area of cotton was equal to 4988.1 $cm^{2,}$ and the dry mass was equal to 129.33 g, and the yield was 43.1 kg\ ha was equal to, and it was determined that it increased by 36% compared to the control.

Key words: fertility, cotton, organic fertilizers, physiological process, biometrical measures, micronutrient, productivity.

I. INTRODUCTION

By 2050, the world's population is expected to increase by approximately 10 billion. To meet the food demand of a growing world population, food production needs to be greatly increased. At the same time, the increase in the world's population due to urbanization and intensive farming puts serious pressure on the available agricultural land [1]. The rapid growth of the population and the reduction of arable land to a certain extent creates the need for the development and scientific justification of measures to increase soil fertility, improve the weight and quality of crops obtained from agricultural crops [9].

Taking into account the ecological problems, the use of micronutrients in combination with proper agrotechnical methods appears to be the most sustainable and cost-effective solution for alleviating food shortages. Reducing the use of macrofertilizers can provide a number of advantages, such as tolerance to biotic and abiotic stresses. The use of microfertilizers rich in biologically available microelements is the most optimal way to improve the nutritional status of plants [2].

To meet the demand for food, it is necessary to increase the production of agricultural crops on the available land. This means that it is necessary to achieve more food production per unit of currently available cropland [3]. After increased fertilization rates, higher yields per unit area led to greater depletion of micronutrients in the soil, and less emphasis was placed on micronutrient fertilization.

Currently, micronutrient deficiency has become a limiting factor in the productivity of many agricultural lands around the world [16]. Nowadays, crop production has increased as a result of intensive crop cultivation, high and quality harvest, improvement of agricultural mechanization, use of micronutrient fertilizers with low amounts of macronutrients, and use of modern irrigation systems [8].

Erosion, dehydration, loss of trace elements as a result of calcification of acidic soils, reduction of organic matter in soils compared to chemical fertilizers are factors that increase the level of trace element deficiency [40]. The problems of micronutrient deficiency have been exacerbated by the high demand for modern crop varieties. Accordingly, low levels of micronutrients have been reported in many crops grown in different countries [41]. Micronutrient deficiencies reduce crop productivity in many agricultural soils. Currently, to increase the productivity of agricultural crops, it is necessary to solve the problem of micronutrient deficiency [42].

In developing countries, there are several solutions, including soil and foliar fertilization, cropping systems, correcting micronutrient deficiencies, and applying organic amendments to increase their density in the digestible parts of plants [17]. Agricultural practices are almost always aimed at maximizing crop yields while minimizing costs. Thus, as a result of the use of chemical fertilizers, the increase in productivity in many agricultural systems was caused by the use of micronutrients in various crops [18].

There are two strategies for increasing food production: (a) expanding agricultural area and (b) increasing productivity per unit area [42]. Agricultural area expansion is limited by lack of fertile land, urbanization, soil degradation, and increasing water scarcity [39]. Focusing on improving the amount of micronutrients in crops, increasing the amount of bioavailable micronutrients in crops to account for plant factors that increase or decrease the bioavailability of plant micronutrients [44].

There are several approaches to reduce micronutrient deficiencies and increase their concentration in plant-available parts, such as soil and foliar fertilization, improved cropping systems, and organic nutrient sources [37]. Considering environmental issues, sustainable agriculture is looking for environmentally friendly and more cost-effective approaches, using less energy and chemicals. Among the various strategies used to correct micronutrient deficiencies in plants, the most sustainable solution, especially for developing countries, is to reduce micronutrient deficiencies in combination with proper agronomic practices [38].

In general, cotton is a valuable plant, from its fiber, seed and other parts, 200-250 types of consumer goods and technical products are obtained, as well as three types of valuable products, namely It provides fiber as raw material for the textile industry, oil for food, and Kunjara and Shelukha as animal feed [36].

Today, the main directions of the world's cotton production are aimed at obtaining a high and high-quality cotton crop due to the introduction of resource and energy-saving technologies. Because 30-40 percent of the world's land areas are depleted of humus, nutrients, and the process of erosion is observed, which leads to a decrease in soil fertility and crop yield. Eliminating these situations is achieved by using microfertilizers in feeding agricultural crops in the USA, Germany, Austria and other countries [23].

Taking into account the fact that the soil is supplied with micronutrients, it is possible to increase the yield by 14-17% in the practice of cotton growing in the world (USA, Egypt, Israel, Turkey, India, etc.). In addition, it is observed that the use of various forms of microfertilizers, optimization of the nutritional regime of crops, increases the tolerance of plants to external extreme conditions [4].

Every plant needs other micronutrients such as zinc and boron in addition to the basic nutrients, namely N, P and K [24].

Boron (B) is an important nutrient for plant growth and development [13]. In many regions of the world, such as Australia, New Zealand, Africa, Spain, USA, Brazil and China, it is used as a micro-fertilizer for the positive development of local agricultural crops [27;35].

Bor on the formation and development of reproductive organs of plants [15; 28] affects, and also plays an important role in the vegetative development of plants [12; 24]. This element affects the transport of substances and the metabolism of photosynthetic products in plants [7; 19] is also involved in the structural composition of cell walls and [32; 43] indirectly affects the metabolism of proteins and nucleic acids [10; 43].

B deficiency can cause irreversible damage to cotton plants and seriously affect cotton yield [33; 34]. Previous studies of B nutrition have focused mainly on changes in plant roots, leaves and pollen. For example, B deficiency inhibits root elongation [22; 26] affects the growth and development of leaves [14; 30]. The important reason is that the root and leaf are the important organs of plants for obtaining nutrients.

Research has shown that B deficiency affects leaf vascular bundles, and B deficiency affects growth and increases vascular tissue in plants [29]. Therefore, B deficiency can hinder the growth and development of cotton, it can disrupt the transport function of stems, derail the transport of nutrients, and reduce the photosynthetic capacity of plants [11].

Ya. V. Peyve said that plants develop comfortably in soils supplied with boron. Soils characterized by a severe deficiency of boron cause defects in the flowering and fruiting of plants, the leaves wither, the stem, sometimes the growing point of the root dies.

Feeding plants with zinc leads to activation of growth [42]. When zinc is not enough, the process of phosphorus exchange is damaged in cotton. Cotton stops growing, chlorosis begins in the leaves, fruiting is delayed, and the process of photosynthesis decreases [5].

Kumar V. (2011) reported the emergence of nano-fertilizers. Although fertilizers are very important for plants to grow and develop, most of the applied fertilizers are not readily absorbed by plants due to many factors. Therefore, it is necessary to minimize the loss of nutrients during fertilization and to increase the yield, it is done with the help of new nanofertilizers [6].

Nanoparticles have become a valuable material in agricultural research today because of their unique physicochemical properties. Nanoparticles significantly increased growth variables (plant height, leaf area, shoot and root fresh and dry weight). Chitosan is obtained from natural chitin, and is used in agriculture as a plant growth stimulant. Chitosan increased root and leaf length, and chitosan-treated seeds also showed higher growth [31].

The development of the technology of applying macro- and micro-fertilizers in appropriate proportions, in convenient terms, standards and methods for growing high-quality cotton crops in the conditions of micronutrient-deficient soils of our republic is one of the urgent issues of agrochemistry and cotton growing [20].

2.Objectives

For high yield of cotton, it is necessary to produce a number of physiological processes in it, that is, to obtain dry mass by obtaining the leaf level, and to obtain a high yield by increasing the dry mass was the basis of the experiment.The main purpose was to change increase several physiological parameters of cotton and thereby obtain a high yield. The purpose of this was to change several physiological indicators of cotton and thereby obtain a higher yield.Our purpose , by increasing the leaf level of cotton, it was possible to accelerate the photosynthesis process, to achieve high productivity by increasing the amount of dry mass.

3. METHODS.

All analyses, phenological observations, calculations were performed based on generally accepted methodologies [46]. The amount of dry matter was determined by L. G. Tretyakov, A. S. Sulaymonov method by drying in a drying cabinet to a constant mass, and the level of leaves was determined by N. N. Tretyakov, [45] and weighing method. Our research was conducted in the gray soils of Pastdargom district of Samarkand region in 2020-2021. We used the "Omad" variety of cotton in our research. This variety is planted in large areas in Samarkand region.

Climate and soil conditions of the research area

Climatic conditions. The growth and development of plants depends on the weather conditions of a particular region, and the agrotechnological processes used to obtain a high and quality harvest should be suitable for this.

The irrigated areas of the Samarkand region belong to the mountainous region and are characterized by a sharply continental climate. It is characterized by an unexpectedly changing climate, drought, heat and light, cold winter, relatively warm and humid spring, dry, hot summer. In autumn, there are often sharp changes in temperature, short-term frosts, precipitation sometimes turning into snow. The main reasons for such sudden changes are the presence of deserts and mountain ranges in the region, as well as the extension of the territory. The climate of Pastdargom district is sharply continental, the average annual temperature is 13.40C, the average temperature in January is -1.20C, the average temperature in July is 270C, the highest temperature is 450C, the average annual precipitation is 312 mm, mainly in winter and spring. it rains The relative humidity of the air during the growing season is 44-54%, the hottest month of the year is July and the coldest month is January.

Soil conditions. In the territory of Pastdargom district of Samarkand region, typical gray soil, light-gray soil, dark-gray soil are considered. Gray soils occupy an area of 2635 thousand hectares in Uzbekistan or 6.40% of the total area of the Republic.

Gray soils are moistened at a depth of 40-120 cm, depending on the weather (natural climate). In gray soils, plant-unusable moisture (withering moisture) is dark in color and 1.5-2 times less than in typical gray soils. This is definitely due to the lightness of the mechanical structure of the soil, the slightly smaller moisture capacity [47].

We conducted our field experiments in a typical gray soil area.

4. Results

A leaf is the most active organ of a plant where all physiological processes take place. The assimilation surface formed by the leaves is of great importance for the growth, development and harvest of plants. A number of factors are important in the formation of the assimilation surface of the leaves, such as feeding the plant with macro- and micro-fertilizers, conducting agrotechnical activities at a high level, water and air regime of the soil. According to A.L. Sanakulov, B.A. Hamedov (2007), the lack of enough leaves and leaf surface in plants leads to incomplete absorption of solar radiation. On the contrary, the expansion of the leaf surface due to the incorrect use of agrotechnological measures causes the leaves to remain in the shade, resulting in inefficient use of photosynthetically active radiation. As a result, productivity decreases. Because, when the leaf level increases, the conditions for photosynthesis worsen (mainly due to the decrease of light), while the reduction of the leaf level causes the small assimilation surface of the leaves to be less than the required level of photosynthesis productivity.

Taking into account the above points, in order to determine the effect of trace elements on the formation of cotton plant leaves and their leaf surface, we studied the dynamics of leaf surface changes according to the experimentally studied options in the main development phases of cotton. The obtained results are given in Table 1.

Treatment of cotton plants with different concentrations of simple NPK fertilizers and micronutrients showed significant increase in plant length, dry mass and leaf area in all variants. Leaf level values were higher in plants treated with micronutrients than in the control option.

In the period of 3-4 leaves, the assimilation surface created by the leaves in the control option is 49.7 cm^2, and in the 1st option, the assimilation surface created by the leaves is 51.1 cm^2, and in the 2nd option, the assimilation surface created by the leaves is 57.6 cm^2, and in the 3rd option, the leaves the assimilation surface created by the leaves is 56.3 cm^2, and in the 4th option the assimilation surface created by the leaves is 64.2 cm^2, and in the 5th option the assimilation surface created by the leaves is 68.6 cm^2, and in the 6th option the assimilation surface created by the leaves is 63.2 cm^2 , and in option 7, the assimilation surface formed by leaves is 51.7 cm^2, and in option 8, the assimilation surface formed by leaves is 57.3 cm^2, and in option 9, the assimilation surface formed by leaves is 62.8 cm^2, and in option 10, the assimilation surface formed by leaves absorption surface is 51.9 cm^2, and in option 11, the absorption surface created by leaves is 63.1 cm^2, and in option 12, the absorption surface created by leaves is 73.7 cm^2, and in option 13, the absorption surface created by leaves is 5 1.2 cm^2, and in option 14, the assimilation surface created by the leaves was 66.9 cm^2.

By the time of pruning, it was found that the leaf level of our plant has increased significantly. In our control option, the leaf area is 450.7 cm^2, in the 1st option, the leaf area is 461.5 cm^2, in the 2nd option, the leaf area is 474.6 cm^2, in the 3rd option, the leaf area is 473.2 cm^2, and in the 4th option, the leaf area is 474.1 cm^2, and in the 5th option, the leaf level of our plant is 514.5 cm^2, and in the 6th option, the leaf level is 473.5 cm^2, in the 7th option, the assimilation surface formed by the leaves is 448.6 cm^2, and in the 8th option, the leaf surface is 474.1 cm^2 the assimilation surface formed by leaves is 457.6 cm^2, and in option 9 the assimilation surface formed by leaves is 471.8 cm^2, and in option 10 the assimilation surface formed by leaves is 470.9 cm^2, and in option 11 the assimilation surface formed by leaves is 472.2 cm^2, In option 12, the assimilation surface created by leaves is 572.8 cm^2, in option 13, the assimilation surface created by leaves is 471.2 cm^2, and in option 14, the assimilation surface created by leaves is 544.1 cm^2.

Table 1.

Options	Cinnabar	Polishing	Flowering	Ripening
Control variant	49,7	450,7	1105,1	4432,6
$N_{200}P_{140}K_{100}+B_{0.05\%}$	51,1	461,5	1187,0	4795,7
$N_{200}P_{140}K_{100}+B_{0.02\%}$	57,6	474,6	1205,3	4867,7
$N_{200}P_{140}K_{100}+Zn_{0.05\%}$	56,3	473,2	1204,1	4761,3
$N_{200}P_{140}K_{100}+Zn_{0.02\%}$	64,2	474,1	1125,3	4860,2
$N_{200}P_{140}K_{100}$+ KUPRUMHITE+NANOSEREBRO	68,6	514,5	1308,4	4988,1
$N_{200}P_{140}K_{100}$+PMK XZ-Co^{2+}	63,2	473,5	1172,0	4869,7
$N_{200}P_{140}K_{100}$+KUPRUMHITE	51,7	448,6	1301,4	4804,5
$N_{250}P_{175}K_{125}+B_{0.05\%}$	57,3	457,6	1327,5	4805,6
$N_{250}P_{175}K_{125}+B_{0.02\%}$	62,8	471,8	1387,1	4849,7
$N_{250}P_{175}K_{125}+Zn_{0.05\%}$	51,9	470,9	1320,1	4830,2
$N_{250}P_{175}K_{125}+Zn_{0.02\%}$	63,1	472,2	1330,5	4851,3
$N_{250}P_{175}K_{125}$+ KUPRUMHITE+NANOSEREBRO	73,7	572,8	1587,5	5285,6
$N_{250}P_{175}K_{125}$+PMK XZ-Co^{2+}	51,2	471,2	1360,2	4970,4
$N_{250}P_{175}K_{125}$+KUPRUMHITE	66,9	544,1	1401,4	5104,5

The effect of microelements on the formation of the leaf surface of cotton. (cm^2).

By the flowering phase, the absorptive surface formed by leaves in our control variant is 1105.1 cm^2, and in the 1st variant, the assimilative surface formed by leaves is 1187.0 cm^2, and in the 2nd variant, the assimilative surface formed by leaves is 1205.3 cm^2, and in the 3rd variant, the assimilative surface formed by leaves is 1205.3 cm^2 absorption surface is 1204.1 cm^2, and in option 4 the absorption surface created by leaves is 1125.3 cm^2, in option 5 the absorption surface created by leaves is 1308.4 cm^2, and in option 6 the absorption surface created by leaves is 1172 cm^2, in option 7 and the absorptive surface formed by leaves is 1301.4 cm^2, and in option 8 the absorptive surface formed by leaves is 1327.5 cm^2, and in option 9 the assimilative surface formed by leaves is 1387.1 cm^2, and in option 10 the assimilative surface formed by leaves is 1320, 1 cm^2, and in option

11, the assimilation surface created by leaves is 1330.5 cm^2, and in option 12, the assimilation surface created by leaves is 1587.5 cm^2, and in option 13, leaves are created It was found that the assimilation surface formed by the leaves was 1360.2 cm^2, and in the 14th option, the assimilation surface formed by the leaves was 1401.4 cm^2.

In the ripening phase, the assimilation surface formed by leaves in our control variant is 4432.6 cm^2, and in the 1st variant, the assimilation surface formed by leaves is 4795.7 cm^2, and in the 2nd variant, the assimilation surface formed by leaves is 4867.7 cm^2, and in the 3rd variant, the assimilation surface formed by leaves absorption surface is 4761.3 cm^2, and in option 4 the absorption surface created by leaves is 4860.2 cm^2, and in option 5 the absorption surface created by leaves is 4988.1 cm^2, and in option 6 the absorption surface created by leaves is 4869.7 cm^2, 7 - in option 4804.5 cm^2 of assimilation surface formed by leaves, in option 8 the assimilation surface formed by leaves is 4805.6 cm^2, in option 9 the assimilation surface formed by leaves is 4849.7 cm^2, and in option 10 the assimilation surface formed by leaves 4830.2 cm2, and in the 11th option, the assimilation surface formed by the leaves is 4851.3 cm^2, and in the 12th option, the assimilation surface formed by the leaves is 5285.6 cm^2, and in the 13th option, the leaves It was found that the assimilation surface created by l was 4970.4 cm2, and in option 14, the assimilation surface created by the leaves was 5104.5cm^2.

Table 2 shows the results of the effect of trace elements on dry mass accumulation of cotton.

Table 2.

Options	Cinnabar	Polishing	Flowering	Ripening
Control variant	1,54	3,85	26,61	106,13
$N_{200}P_{140}K_{100}+B_{0.05\%}$	1,56	4,24	27,60	127,28
$N_{200}P_{140}K_{100}+B_{0.02\%}$	1,57	4,51	30,61	122,83
$N_{200}P_{140}K_{100}+Zn_{0.05\%}$	1,55	4,49	29,74	122,40
$N_{200}P_{140}K_{100}+Zn_{0.02\%}$	1,57	4,40	27,77	118,67
$N_{200}P_{140}K_{100}$+ KUPRUMHITE+NANOSEREBRO	1,58	4,56	30,83	129,33
$N_{200}P_{140}K_{100}$+PMK XZ-Co^{2+}	1,56	4,41	28,96	120,18
$N_{200}P_{140}K_{100}$+KUPRUMHITE	1,56	4,43	30,58	123,32
$N_{250}P_{175}K_{125}+B_{0.05\%}$	1,57	4,51	30,89	129,21
$N_{250}P_{175}K_{125}+B_{0.02\%}$	1,61	4,47	32,48	125,68
$N_{250}P_{175}K_{125}+Zn_{0.05\%}$	1,57	4,52	32,31	124,48
$N_{250}P_{175}K_{125}+Zn_{0.02\%}$	1,59	4,45	31,92	126,19
$N_{250}P_{175}K_{125}$+ KUPRUMHITE+NANOSEREBRO	1,70	4,72	36,65	135,33
$N_{200}P_{175}K_{125}$+PMK XZ-Co^{2+}	1,57	4,62	33,20	124,72
$N_{250}P_{175}K_{125}$+KUPRUMHITE	1,55	4,66	33,93	126,56

The effect of microelements dry mass of cotton. (cm^2).

The obtained results show that in the period of 3-4 cinnabar, the dry mass is 1.54 g in the control variant, and in the 1st variant, the dry mass is 1.56 g, in the 2nd variant, the dry mass is 1.57g, and in the 3rd variant, the dry mass is 1.55g. In option 4, the dry weight is 1.57 g, in option 5, the dry weight is 1.58 g, in option 5, the dry weight is 1.56 g, in option 6, the dry weight is 1.56 g, and in option 7, the dry weight is 1.57 g, and in option 9, the dry mass is 1.61 g, and in option 10, the dry mass is 1.57 g, and in option 11, the dry mass is 1.59 g, and in option 12, the dry mass is 1.70 g, 13 - in the variant, the dry mass was 1.57 g, and in the 14th variant, the dry mass was 1.55 g.

In the planing phase, the dry mass in our control option is 3.85 g, in the 1st option the dry mass is 4.24 g, in the 2nd option the dry mass is 4.51 g, in the 3rd option the dry mass is 4.49 g, and in the 4th option dry mass is 4.40 g, and in option 5, dry mass is 4.56 g, and in option 5, dry mass is 4.41 g, and in option 6, dry mass is 4.43 g, and in option 7, dry mass is 4.51 g, 9 - the dry mass in the option is 4.47 g, in the 10th option the dry mass is 4.52 g, in the 11th option the dry mass is 4.45 g, in the 12th option the dry mass is 4.72 g, and in the 13th option the dry mass is 4 ,62 g, and in option 14, the dry mass was 4,66 g.

In the flowering phase, the dry mass in the control variant is 26.61 g, in the 1st variant, the dry mass is 27.60 g, in the 2nd variant, the dry mass is 30.61 g, in the 3rd variant, the dry mass is 29.74 g, and in the 4th variant, the dry mass is 29.74 g. mass is 27.77 g, and in option 5, dry mass is 30.83 g, and in option 6, dry mass is 28.96 g, and in option 7, dry mass is 30.58 g, and in option 8, dry mass is 30.89 g, In option 9, the dry weight is 32.48 g, in option 10, the dry weight is 32.31 g, in option 11, the dry weight is 31.92 g, in option 12, the dry weight is 36.65 g, and in option 13, the dry weight is 33.20 g, and in option 14, the dry mass was 33.93 g.

In the ripening phase, the dry mass in the control variant is 106.13 g, in the 1st variant, the dry mass is 127.28 g, in the 2nd variant, the dry mass is 122.83 g, in the 3rd variant, the dry mass is 122.40 g, and in the 4th variant, the dry mass is 122.40 g. mass 118.67 g, and in option 5 dry mass 129.33 g, in option 5 dry mass 120.18 g, in option 6 dry mass 1233.32 g, in option 7 dry mass 129.21 g, and in option 9 dry mass is 125.68 g, and in option 10, dry mass is 124.48 g, and in option 11, dry mass is 126.19 g, and in option 12, dry mass is 135.33 g, and in option 13, dry mass is 124.72 g , and in option 14, the dry mass was 126.56 g.

In our experiments, we also studied the effect of micronutrients on the productivity of our plants. The results are given in Table 3.

Table 3.

Effect of micronutrients on the productivity of cotton.

Options	Productivity kg\ha		Additional crop
	Total	kg\ha	%
Control variant	33.9	-	100.00
$N_{200}P_{140}K_{100}+B_{0.05\%}$	39.5	5,6	116,51
$N_{200}P_{140}K_{100}+B_{0.02\%}$	39.7	5,8	117,10
$N_{200}P_{140}K_{100}+Zn_{0.05\%}$	41.0	7,1	120,94
$N_{200}P_{140}K_{100}+Zn_{0.02\%}$	39.8	5,9	117,40
$N_{200}P_{140}K_{100}$+ KUPRUMHITE+NANOSEREBRO	43.1	9,2	127,13
$N_{200}P_{140}K_{100}$+PMK XZ-Co^{2+}	42.7	8,8	125,95
$N_{200}P_{140}K_{100}$+KUPRUMHITE	40.2	6,3	123,89
$N_{250}P_{175}K_{125}+B_{0.05\%}$	40.4	6,5	119,17
$N_{250}P_{175}K_{125}+B_{0.02\%}$	44.2	10,3	130,38
$N_{250}P_{175}K_{125}+Zn_{0.05\%}$	43.7	9,8	128,90
$N_{250}P_{175}K_{125}+Zn_{0.02\%}$	41.8	7,9	123,30
$N_{250}P_{175}K_{125}$+ KUPRUMHITE+NANOSEREBRO	45.6	11,7	134,51
$N_{250}P_{175}K_{125}$+PMK XZ-Co^{2+}	42.3	8,4	124,77
$N_{250}P_{175}K_{125}$+KUPRUMHITE	42.6	8.7	125,66

From the data presented in the table, it was determined that the yield in our control variant was equal to 33.9 s. On the other hand, the best result was recorded in our version N250P175K125+KUPRUMHITE+NANOSEREBRO, the yield was 45.6 s\ and 117.7 s\ more than the control option. Also, in our option N200P140K100+CUPRUMHITE+NANOCEREBRO, the yield was 43.1 cents and it was found that the yield was 127.13% more than our control option.

Discussion.

1.It was found that the dry mass accumulation of cotton grown in the conditions of Samarkand region is the highest in the flowering and ripening phases.

2.The dry mass formation of cotton increased rapidly with nitrogen fertilizers N200P140K100kg/day, and it was observed that the increase of fertilization had little effect on the increase of dry mass.

3.It was found that the most favorable rate of nitrogen for cotton grown in the conditions of Samarkand region is 200 kg per hectare, and in this, dry mass is formed from 118.67 to 129.33 g.

4.The best result was observed in our variant N200P140K100+CUPRUMHITE+NANOSEREBRO and the yield was equal to 43.1 s\.

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