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EFFECT OF MICROELEMENTS (B, ZN) ON EXTEND OF COTTON PLANT'S LEAF AREA

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Abstract

This article presents the results of the study of the effect of microelements on the leaf area of cotton in 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 $N_{200}P_{140}K_{100}$ +KUPRUMHITE+NANOSEREBRO kg/ha was applied with mineral fertilizer.

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

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 [5].

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 [6]. 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 [4].

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 [9]. 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 [10]. 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 [11].

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 [7]. 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 [8].

2.Object and Methods of Research

For high yield of cotton, it is necessary to produce a number of physiological processes in it, that is, to obtain leaf area by obtaining the leaf level, and to obtain a high yield by increasing the leaf area was the basis of the experiment.The main purpose was to change increase several physiological parameters of cotton and

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thereby obtain a high yield. The purpose of this was to change several physiological indicators of cotton and thereby obtain a higher yield.

2.1.METHODS

All analyses, phenological observations, calculations were performed based on generally accepted methodologies [13]. The level area of leaves was determined by N. N. Tretyakov, [12] and weighing method. Our research was conducted in the gray soils of Pastdargom district of Samarkand region in 2020-2022. 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

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

3.Results Obtained and Their Analysis

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 the2nd 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. The effect of microelements on the formation of the leaf surface of cotton. (cm^2).

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

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N200P140K100+ 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
N250P175K125+B0.05%	57,3	457,6	1327,5	4805,6
N250P175K125+B0.02%	62,8	471,8	1387,1	4849,7
N250P175K125+Zn 0.05%	51,9	470,9	1320,1	4830,2
N250P175K125+Zn 0.02%	63,1	472,2	1330,5	4851,3
N250P175K125+ 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

By the flowering phase, the absorptive surface formed by leaves in our control variant is 1105.1 cm2, and in the 1st variant, the assimilative surface formed by leaves is 1187.0 cm2, and in the 2nd variant, the assimilative surface formed by leaves is 1205.3 cm2, and in the 3rd variant, the assimilative surface formed by leaves is 1205.3 cm2 absorption surface is 1204.1 cm2, and in option 4 the absorption surface created by leaves is 1125.3 cm2, in option 5 the absorption surface created by leaves is 1308.4 cm2, and in option 6 the absorption surface created by leaves is 1172 cm2, in option 7 and the absorptive surface formed by leaves is 1301.4 cm2, and in option 8 the absorptive surface formed by leaves is 1327.5 cm2, and in option 9 the assimilative surface formed by leaves is 1387.1 cm2, and in option 10 the assimilative surface formed by leaves is 1320, 1 cm2, and in option
11, the assimilation surface created by leaves is 1330.5 cm2, and in option 12, the assimilation surface created by leaves is 1587.5 cm2, and in option 13, leaves are created It was found that the assimilation surface formed by the leaves was 1360.2 cm2, and in the 14th option, the assimilation surface formed by the leaves was 1401.4 cm2.

In the ripening phase, the assimilation surface formed by leaves in our control variant is 4432.6 cm2, and in the 1st variant, the assimilation surface formed by leaves is 4795.7 cm2, and in the 2nd variant, the assimilation surface formed by leaves is

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4867.7 cm2, and in the 3rd variant, the assimilation surface formed by leaves absorption surface is 4761.3 cm2, and in option 4 the absorption surface created by leaves is 4860.2 cm2, and in option 5 the absorption surface created by leaves is 4988.1 cm2, and in option 6 the absorption surface created by leaves is 4869.7 cm2, 7 - in option 4804.5 cm2 of assimilation surface formed by leaves, in option 8 the assimilation surface formed by leaves is 4805.6 cm2, in option 9 the assimilation surface formed by leaves is 4849.7 cm2, 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 cm2, and in the 12th option, the assimilation surface formed by the leaves is 5285.6 cm2, 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 5104.5cm2.

Conclusion

1.It was determined that the most favorable nitrogen rate for cotton grown in the conditions of Samarkand region is 200 kg per hectare, and the leaf level is from 57.6 g cm2 to 4867.7 cm2.

2.N250P175K125+CUPRUMHITE+NANOCEREBRO in our option, it was determined that the leaf surface will be from 73.7 cm2 to 5285.6 cm2.

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