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THE INFLUENCE OF THE NORMS OF MICROELEMENTS ON THE BIOMETRIC INDICATOR AND QUALITY OF GRAIN OF SOYBEAN VARIETY "ORZU"

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Abstract:

The article is devoted to the study of the influence of microelements when sowing the Orzu soybean variety in stubble crops after grain crops under conditions of typical serozem soils of the Tashkent region. As well as data on the biometric indicator and quality of soybean grain: stem height, number of beans, number of grains, grain weight, weight of 1000 grains, protein and oil content. According to the biometric indicator and grain quality, the highest was observed when foliar top dressing was applied with mixed norms of trace elements of boron 0.4 and zinc 0.7 kg/ha in the phase of branching and flowering

Keywords: Stubble Sowing, Variety "Orzu", Norms And Terms Of Microelements, Plant Height, Biometric Indicator And Quality Of Soybean Grain.

INTRODUCTION

In order to increase the effectiveness of reforms and ensure food security in the country, the President of the Republic adopted a number of Resolutions and Decrees. In order to implement the Decree of the Cabinet of Ministers of the Republic of Uzbekistan PP-2835 dated March 14, 2017 "On measures to organize sowing and increase soybean grain production in the republic in 2017-2021". On February 10, 2018, Resolution No. 105 "On measures to increase soybean production in the Republic" was adopted. Soybean can be grown both as a main crop and as a secondary crop in all regions of the country and in the Republic of Karakalpakstan. Soybeans contain 30-52% protein, 18-25% oil and 20% carbohydrates. Soybean seeds are used in the confectionery industry, for the preparation of soy milk, kefir, cottage cheese, margarine, flour, various canned and vegetarian sausages and dietary oils.

For a more intensive introduction of soybeans into production, we set the task of determining the optimal nutrients for the cultivation of soybeans in stubble crops.

OBJECT OF RESEARCH

The object of the study is the "Orzu" soybean variety, soil typical of gray soils of the experimental field. The Research Institute of Breeding, Seed Production and Agricultural Technology of Cotton Growing

LITERATURE REVIEW

The chemical composition of soybean plants varies greatly depending on the soil and climatic conditions. Compared to winter wheat, the main unit of the product consumes 2.3 times more nitrogen, 1.6 times more phosphorus, and 1.9 times more potassium at the same time [1].

Chemicalization in resource-saving technologies of adaptive landscape agriculture recommended the use of sulfur for soybeans. The yield of this element with crops is 2.5 t/ha. Trace elements also play a critical role in crop structure. By value, they are arranged in descending order: molybdenum, zinc, copper, manganese, boron and iron [2].

Trace elements zinc, copper, carbon monoxide, molybdenum, chromium, nickel is of great importance not only for living organisms, but also for soil formation processes. The impact of microelements on the growth processes of plants at the stage of their development leads to the fact that all biogeochemical processes of accumulation and transfer of organic compounds in the ecosystem are determined by the level of their content. In addition, trace elements have a stimulating effect on the activity of microorganisms, as a result of which the processes of humus formation in soils are activated [3].

The experiments were carried out on a peasant farm "Progress" in the Tyumen region. The soil of the experimental area is a simple medium humus clayey chernozem. Alton soybean variety was sown. The use of macro

fertilizers without micronutrients shows a relatively low yield compared to the use together. The highest yield of soybean grains was obtained first of all in the nitrogen and molybdenum variant, in the second-place nitrogen and zinc combined variant [4].

Field experiments were carried out on the fields of the educational institution of the Belgorod State Agricultural Academy, in the conditions of selective exchange plantings of the department of the Belarusian Agricultural Academy. The soil of the territory is described as washed chernozem, the amount of humus is 3.42-3.70%, the pH value of the salt is 5.42-5.51%. Before sowing soybean seeds, aqueous solutions of trace elements in the form of chelates were used - ascorbic zinc and cobalt with various concentrations. With the combined use of highly concentrated ascorbic zinc and cobalt, it was determined that the yield increases by 0.17 t/ha. As a result of seed treatment before planting with microelement preparations, the amount of protein in the green mass increases to 0.3-0.8% and in the grain 1.9-3.0%, the amount of nitrate ion decreased to 3.6-17.4 mg/kg in the green mass, the total amount of protein has increased, and the accumulation of protein and fat in the grain content area increases the nutritional value of the green and concentrated feed [5].

In arable soils of the Kemerovo region, fruit plants, corn and soybeans, are especially sensitive to microelement deficiency [6].

When increasing the yield of soybeans by optimizing nutritional conditions, low-cost foliar top dressing is used [7].

Field studies were carried out on the experimental field of the Podolsk State Agrarian Technical University (Kamenes-Podolsky, Ukraine). The soil of the experimental field is a typical heavy forest clayey chernozem. Sowed medium fast ripe variety Omega. The combination of the microelement Reacom-P in the form of a chelate increased the shape of the beans and the yield of soybeans. The use of foliar feeding during the flowering phase resulted in an increase in bean and soybean yields. It was found that the greatest effect when using the Basfolil 6-12-6 fertilizer led to the fullness of the beans and increased the yield of products [8].

Field experiments were carried out to study the effect of potassium, boron and zinc on the growth, foliar application and yield of soybeans in a Bapatla Agricultural College farmer. The result showed that calcium nitrate 2%, boric acid 50%, zinc sulfate 1%, in foliar application 30 and 60 days later plant height, number of branches, number of leaves, leaf area, total dry matter, number of pods, seed weight and yield was higher than in the control [9].

MATERIALS AND METHODS

Field research was carried out in 2021 at the Central Experimental Station "Okkovoq" of the Scientific Research Institute of Breeding, Seed Production and Agricultural Technology of Cotton Growing.

The total amount of humus at a horizon of 0-30 and 30-50 cm at the beginning of the growing season of the experimental field, the content of the soil was 0.896-0.563%, the content of total nitrogen was 0.071-0.045%, the content of total phosphorus was 0.135-0.110%, respectively. The soil is characterized by good water permeability, which has a weakly structured and high capillarity. This soil is poorly supplied with nitrogen and humus. The amount of humus sharply decreased as the soil deepened.

Field and laboratory research methods developed by the Uzbek Research Institute of Cotton Growing (2007) were used, phenological observations were carried out according to the "Methodology of the State Variety Testing of Agricultural Crops" (1985). Statistical data processing according to B.A. Dospekhov "Methodology of field experience" (1985), Crude fat was determined by the fat-free residue method in the Soxhlet apparatus; protein is determined by multiplying the amount of nitrogen by a factor of 6.25. Nitrogen was determined by the Kjeldahl method.

Agrotechnical measures on experimental crops were carried out in accordance with the accepted zonal soybean cultivation technology for the Tashkent region. The experiment was carried out in the field of 8 variants and 3 repetitions. The area of each option was 84 m2 (length 30 m, width 2.8 m). The number of accounting plants was 25 pieces from each plot. Sowing was carried out on July 5. Sowing was carried out by ordinary and wide-row (70x2.5 cm) methods, the seeding depth was 4-5 cm, the seeding rate was 550 thousand seeds per 1 hectare. Furrow irrigation, distance between furrows 70 cm, irrigation rate 800 m3/ha per 1 irrigation. Prior to sowing, nitrogen 75 kg/ha, phosphorus 75 kg/ha, potassium 100 kg/ha were applied. In the budding phase, the remaining fertilizers were applied nitrogen 25 kg/ha, phosphorus 25 kg/ha and potassium 50 kg/ha. In the experiments, trace elements were used in the branching phase, as well as branching and flowering together. For 10 liters of water in each plot, the norms of the microelement boron 0.2; 0.4 and 0.6 l/ha and the norms of zinc 0.5; 0.7; 1.0 l/ha. The prepared solution was sprayed manually using a special sprayer in the cool time of the day in the evening.

RESULTS AND DISCUSSION

The influence of the term and norm of microelements had an impact on the biometric indicator of soybean yield.

Table-1

Biometric indicator of the yield of soybean variety "Orzu", 2021

№	Variants	plant height, cm	Number of beans, pieces	Corn		Weight of 1000 grains, gram
				number, pieces	mass, grams	
1	The control- (Without trace elements)	65	18,5	40,6	5,3	131,5
Branching phase						
2	$B_{0,2}$	67	20,3	44,7	6,0	135,5
3	$B_{0,4}$	76	22,0	48,4	6,7	139,1
4	$B_{0,6}$	71	21,2	46,8	6,4	137,0
5	$Zn_{0,5}$	78	19,1	42,2	5,6	133,2
6	$Zn_{0,7}$	83	21,0	46,3	6,3	137,1
7	$Zn_{1,0}$	80	20,2	44,4	6,1	135,8
Branching and flowering phase						
8	$B_{0,4}$+ $Zn_{0,7}$	89	23,5	51,6	7,3	142,3
	HCP_{05}				0,26-4,82	
	S $\bar{x}$ %				4,1-3,5	

The height of the plants in the control variant was 65.0 cm. The branching phase, in the variants of foliar feeding of boron microelements with norms of 0.2-0.6 kg/ha, the height of the plants increased from 2.0 to 6.0 cm compared to the control (without the microelement) option.

In the variants of foliar feeding of the trace element zinc at a rate of 0.5-0.7 kg/ha, an increase in plant height by 13.0-18.0 cm was observed compared to the control (without microelements) variant. Branching phase, carrying out foliar feeding of the microelement zinc at a rate of 1.0 kg/ha, a decrease in plant height by 3.0 cm was revealed compared to zinc at a rate of 0.7 kg/ha in the variant.

The branching phase, the use of foliar feeding of the microelement boron at a rate of 0.2-0.6 kg/ha increased the number of beans from 1.8 to 3.5 pieces compared to the control (without microelement) variant. The branching phase, in the variants of the trace element zinc at a rate of 0.5-0.7 kg/ha, an increase in the number of beans from 0.6 to 2.5 pieces was observed, compared with the control (without microelements).

The number of grains on one plant in the control variant was 40.6 pieces. It was revealed that in the variants of foliar feeding of boron microelements with norms of 0.2-0.6 kg/ha, the number of grains increased from 4.1 to 7.8 cm compared to the control variant (without the microelement).

There was an increase in the content of the number of grains from 0.7 to 1.4 pieces in the variants with the use of the zinc microelement at the rate of 0.5-0.7 kg/ha, compared with the control (without microelements). In the variants of foliar feeding of the microelement zinc at a rate of 0.5-0.7 kg/ha, an increase in the number of grains by 0.3-1.0 pieces was observed compared to the control (without microelements) variant. It was revealed that in the phase of branching and flowering of the application of the norm of boron 0.4 and zinc 0.7 kg/ha, the number of grains was 51.6 pieces, which increased by 11.0 pieces compared to the control variant.

It was observed that the mass content of 1000 grains increased from 4.0 to 7.6 grams in the variants with the use of foliar feeding of the microelement boron at the rate of 0.2-0.6 kg/ha compared to the control (without microelements) variant.

It was determined that the increase in the mass content of 1000 grains was 1.7-5.6 grams in the variants with the use of foliar feeding of the zinc microelement of the norm of 0.5-0.7 kg/ha, compared with the control (without microelements) variant.

The highest was observed in the 8th variant in the phase of branching and flowering together with the application of the norm of boron 0.4 and zinc 0.7 kg/ha.

The chemical composition of the grains is mainly characteristic of the variety. But agrotechnical measures, plant growing conditions affect the quality of grains.

Table - 2

Chemical properties of plant substances of the "Orzu" variety, depending on the norm of microelements, 2021

№	Variants	Content, %	
		Protein	oil content
1	Control-(no trace elements)	30,6	19,38
Branching phase			
2	$B_{0,2}$	32,4	19,87
3	$B_{0,4}$	34,2	21,24
4	$B_{0,6}$	33,3	20,20
5	$Zn_{0,5}$	31,1	19,52
6	$Zn_{0,7}$	33,5	20,67
7	$Zn_{1,0}$	32,7	20,04
Branching and flowering phase			
8	$B_{0,4}$+ $Zn_{0,7}$	37,8	22,11

The control-(no trace elements) soybean grain had 30.6% protein and 19.38% fat. In the branching phase in the variants of foliar feeding of boron microelements with norms of 0.2-0.6 kg/ha, the protein content increased from 1.8 to 3.6%, and the oil content increased by 0.49-1.86% compared to the control variant (without trace elements). In the branching phase in the variants of foliar feeding with a zinc microelement at the rate of 0.5-1.0 kg/ha, the protein content was 31.1-33.5%, and the oil content was 19.52-20.67%. The highest was observed in the 8th variant, the protein content increased by 7.2%, and the oil content increased to 2.73%, compared with the control (without trace element) variant.

CONCLUSIONS

The article presents the data of the "Orzu" soybean variety during stubble crops, as well as data on biometric and grain quality: stem height, number of beans, number of grains, grain weight, weight of 1000 grains, protein and oil content. In the phase of branching and flowering, foliar feeding of trace elements of boron 0.4 and zinc 0.7 kg/ha, the number of beans increased by 23.5 pieces, compared to other options. The highest protein and oil content was obtained by using mixed norms of trace elements of boron 0.4 and zinc 0.7 kg/ha in the phase of branching and flowering.

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