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EFFECT OF REPEATED CROPPING ON SEED QUALITY INDICATORS OF MUSHROOM AND SOYBEAN CROPS

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Abstract
This article examines the effect of mung bean and soybean crops grown as a secondary crop on seed quality indicators. The study analyzed the growth ability of seeds, germination, productivity, and phytopathological status of both types of crops. The work was aimed at determining the beneficial properties of transplanted mung bean and soybean crops, the effect of soil fertility, and changes in climatic conditions on seed quality indicators. As a result, changes in the seed quality indicators of cotton varieties were analyzed and recommendations were given for improving agricultural practices.

Keywords: Secondary sowing, mung bean, soybean, seeds, quality indicators, soil fertility, fertility, yield, agricultural technology.

Introduction

Due to the use of the most advanced chemical and technological achievements in agriculture in developed countries, the loss of naturalness of products is especially noticeable there. Therefore, in recent years, there has been a demand for organic (natural) products in the world. Especially financially well-off people are trying to consume organic products, thinking about their health. This, in turn, creates a supply based on the formed demand. That is, it creates the basis for the emergence of markets for organic products[1].

The world's population is growing rapidly [2] It is necessary to increase the number of people in the world and regularly provide them with ecologically pure food products, to improve the agrotechnology of crops that maintain soil fertility and increase crop yields while obtaining high-quality crops. In particular, mung beans and soybeans are used as raw materials in various

[1] https://dehqon.uz/uz/malumotlar/view/308
[2] https://aniq.uz/uz/statistika/dunyo

industrial sectors, in particular in the production of food, oil and dietary products. Mung beans and soybeans are plants that have the ability to return nitrogen to the soil, which makes them important in increasing soil fertility. Their use in crop rotation helps to improve soil quality. Soybeans are used not only for oil, but also for protein-rich food products, such as soy milk and tofu. Mung beans are used in various traditional dishes, such as mashurda and pilaf. In Europe, mung bean and soybean cultivation has been increasing significantly in recent years, especially in the context of soybeans. This process is associated with a number of factors, including food security, climate change and environmental requirements. Below is more information on mung bean and soybean cultivation in Europe. Mung bean (Vigna radiata) is a traditionally under-utilized crop in developed countries, and its demand in this region has recently increased. Mung bean root grows well in tropical and subtropical climates. However, in southern parts of Europe, such as Spain, Italy, Greece and parts of France, where the mild climate and seasonal sunshine make it possible to grow mung beans.

Mung beans are mainly used in healthy lifestyles and in vegetarian or vegan diets. Products made from mung beans are used in salads and various dishes, helping to ensure food security. Soybeans are becoming increasingly popular as an oil crop. Soybean cultivation is widespread in several European countries, including France, Italy, Serbia, Romania and Hungary.

Soybean cultivation is important for many agricultural sectors in Europe, providing nitrogen and improving soil fertility. As a nitrogen-fixing crop, soybeans help reduce environmental impact. Soybeans grow well in warm climates. Europe, especially its central and eastern parts, has favorable conditions for soybeans. Europe’s agricultural sector is expected to grow in response to climate change, which will increase the resilience of soybean production.

Demand for GMO-free products in Europe Europe has strict regulations on genetically modified organisms (GMOs). Therefore, special attention is being paid to the cultivation of GMO-free varieties of soybeans and mung beans. Sustainable agriculture European farmers are striving to implement environmentally sustainable cropping systems, which include soybeans and mung beans. These crops help improve soil and increase its fertility. Europe still imports large quantities of soybeans. South American countries, especially Brazil and Argentina, are the leading suppliers of soybeans to Europe.

At the same time, Europe is trying to increase soybean production, especially as demand for soybeans increases on world markets. Sowing soybeans and mung beans in Uzbekistan is important for agriculture, as these crops have a number of economic, food security and environmental benefits.

Since mung beans and soybeans are in high demand, they serve as a good source of income for farmers and producers. There is an opportunity to export mung beans not only to the domestic market in Uzbekistan, but also abroad. Soybeans create added value for agricultural products during their production process and help develop the production chain. As legumes, mung beans and soybeans help enrich the soil with nitrogen. This is due to their ability to absorb nitrogen from the air. Nitrogen makes the soil fertile, which is important for increasing the productivity of other crops.

Different regions of Uzbekistan, especially valleys and areas with proper irrigation systems, have suitable conditions for planting mung beans and soybeans. These crops are suitable for the climatic conditions of Uzbekistan and are a reliable source of income for farmers.

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LITERATURE ANALYSIS AND METHODS

The main basis of agricultural science is the introduction of crop rotation in agriculture, maintaining and increasing soil fertility. In order to increase soil fertility through crop rotation, and to obtain high-quality and high-yield agricultural crops through rational use of land, many scientific research works have been carried out in previous years.

B.M. Khalikov [1; 71–b] reported that in the crop rotation systems of 2:1, winter wheat + cover crop (mush): winter wheat + cover crop (mush): cotton or winter wheat + cover crop (mush): winter wheat + cover crop (mush) + catch crop (rye): cotton and 1:1:1, winter wheat + cover crop + catch crop (triticale): soybean: cotton, 185–215 kg of biological nitrogen remained in the soil after one rotation. It is known that the degree of preservation and increase of soil fertility, the rapidity of microbiological processes, and the ability to form humus mass in the soil certainly depend on the number of microorganisms. The number of microorganisms in the soil depends on the type of soil and its agrophysical properties. According to F.V. Turchin [2; 10–11–b], plants that are planted in rotation throughout the year provide beneficial microflora in the soil. Due to the fermentation properties of microorganisms, nutrients that are difficult for plants to absorb are also used.

According to American scientists N.M. Taylor, N.R. Gardner [3; 153–b], a very high soil bulk density negatively affects the soil aeration process, as a result of which the plant cannot develop freely and the plant stops growing.

Researcher V. Volger [4; 143–146–b], as a result of the crushing of plant residues, 30–60 kg of nitrogen per hectare is accumulated and the nutrition of the next main crop is improved. In addition, catch crops create an important food base for animals and improve the nutrient composition of the soil. They also prevent the leaching of nutrients from the lower layers of the soil under the influence of autumn and winter precipitation.

Similar ideas are expressed by the Austrian scientist R. Binder [5; 29–b], who considers catch and repeated crops to be one of the important factors for the intensification of agriculture. They are not only additional and inexpensive fodder plants, they improve soil structure, increase fertility, and lead to an increase in the yield of grain and grain-legume products in crop rotation.

One of the factors determining soil fertility is the problem of humus formation. The increase in the amount of humus in the soil depends on the amount of organic residues remaining in the soil.

According to P.K. Ivanov, A.B. Khudyak [6; 18–19–b], grain crops leave 40–60 kg/ha of nitrogen and 35 kg/ha of phosphorus in the soil through the residues of rye, and corn leaves 65–80 kg/ha of nitrogen and 20–25 kg/ha of phosphorus, respectively.

Based on the data of I.S. Popov [7; 169–186–b], it was determined that 1 kg of mung bean contains 1.24 nutritional units and 175 digestible proteins, and 0.44 nutritional units and 30 digestible proteins in sorghum.

One of the positive properties of soybean is its ability to absorb biological nitrogen from the air, which has a positive effect on the agrostructure of the soil and its fertility (U.M. Ne'matov [8; 18–b]).

In the cotton-wheat rotation system of the Andijan region on light gray soils, the areas where cotton is planted after wheat are cultivated to a depth of 22–25 cm and repeated corn cultivation improves the soil bulk density by 0.05–0.06 g/cm3 and humus by 0.14–0.17% compared to the control, which allows for a high cotton yield in the following year, A. Haydarov and S. Bahromov [9; 149–

151–b].

M. Boboyorov, P. Panjiev [10; 38–39–b] scientific research shows that intercropping effectively increased soil fertility by leaving 31.3 vetch; 31.5 peas; 52.2 rye; 21.6 mustard c/ha of stubble and root residues in the 0–30 cm layer of soil.

One of the legume crops that improves and increases soil structure is soybean. In many literatures, soybean is described as a legume crop that highly improves the agrochemical properties of the soil. Based on the above, many scientists have conducted scientific studies on its effectiveness. In particular, Kh.S.Romanov, K.M.Mirzajonov, R.T.Tolibulin [11; 112–b].

Yu.G.Koryagin [12; 128–b] in his experiments conducted in Kazakhstan, observed that the root nodules of soybean roots accumulated up to 300 kg/ha of biological nitrogen per hectare.

V.I. Zaveryukhin [13; 160–b] noted that the soybean root system is well developed, which improves the physical properties of the soil and helps nutrients from its deep layers to rise, increasing the nitrogen content in the soil.

In experiments conducted in Tajikistan (U.M. Makhmadiyorov [14; 22–b]), it was noted that an average yield of 18 t/ha was obtained from replanted soybeans without fertilizers, and 24.4 t/ha with nitragin.

A.M. Nuriddinov [15; According to the results of the experiment conducted in the conditions of meadow-sod soils of [107–108–b], when sowing winter rye, corn (for grain), mustard (for green manure), it was observed that soil fertility increased slightly, cotton yield increased by 4.3–5.0 centners and its quality improved. It was determined that the amount of humus in the soil, depending on the plant and root residues left in the field, was on average from 1.13% to 1.35%.

Based on the above considerations, it can be said that the use of intercrops, cereals, legumes in the rotation or alternating planting of agricultural crops, and the maintenance and increase of soil fertility are the most important agrotechnical measures.

RESULTS

The purpose of the study is to determine the effect of stubble and root residues left under repeated crops (soybean and mung bean) and mineral fertilizer rates on the yield and seed quality of medium-fiber varieties "Andijan-36" and "Navruz" in the conditions of light gray soils of the Andijan region.

In our experiments, soil samples, phenological observations, agrochemical, technological analyzes were taken at the UzPITI The method was carried out on the basis of the methodological manuals “Methodology of field experiments with cotton”, “Methods of conducting field experiments”, “Methodology of State variety testing of agricultural crops”, “Methods of agrochemical, agrophysical and microbiological studies in irrigated cotton regions” and “Methods of agrochemical analyses of soils and plants in irrigated regions of Central Asia”. Mathematical and statistical analyses of the data were calculated according to the method of B.A. Dospekhov’s “Methodology of field experiments”.

Even in the currently implemented short-rotation crop rotation systems, many areas remain vacant without repeated crops after winter wheat to improve soil fertility. The practical significance of our research is always that if mung bean and soybean are planted as repeated crops after winter wheat at acceptable fertilizer rates, the soil composition and the quality of cotton seeds (seeds) improved compared to the initial material under their influence.

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Our field experiments In 2009–2011 (every year), we determined the seed quality of cotton seeds before sowing seeds in a new field. According to the data obtained, the germination rate of Andijan-36 variety seeds was 91–91.5% (initially) proportional to the years of study, the germination rate was 91–91%, and the maturity was 94/11–95/12, while the Navruz variety was 0.1–0.2% lower.

The data obtained from the research results are presented below, and in the variants (1 and 6) where cotton varieties were planted after winter wheat, the germination energy of seeds in the years of study was 92–91; 91–91; 91–90 proportional to the crop branches and cotton varieties, and the average was 92–91%. These indicators are 0.5–1.0% higher than the initial state, and on average 0.6% lower for the Navruz variety than for the Andijan-36 variety. Thus, it was found that even when cotton varieties were planted after winter wheat in a short crop rotation, the quality of the seeds slightly improved compared to the initial state.

When the Andijan-36 variety was used in repeated sowing of mung bean at the rates of N-25, P_2O_5-80, K_2O-60 kg/ha, and then sown on the created background, the seed germination energy was 97; 95; 94%, the germination capacity was 98; 97; 96%, the maturity was 100/11; 98/12; 97/13, and the moisture content was 7.1; 7.2; 7.3%, which was on average 3.2; 4.4; 3.0% higher than the control and the moisture content was 0.4% lower.

The average indicators of the Navruz variety on the same background (var 7) were 96; 94%, 96.7/12% and 7.3%, which was 0.2; 2.0; 2.0% less and 0.1% higher than that of Andijan-36.

In the background created when N–50, P_2O_5–80, K_2O–60 kg/ha was applied to the mung bean plant, the germination energy of the seeds of the Andijan-36 variety was 95; 93; 91%, the germination rate was 97; 96; 95%, the maturity was 98/12; 97/13; 96/14% and the moisture content was 6.9; 7.1; 7.3%, which was definitely higher than the control. However, the indicators of the Navruz cotton variety on this background (from Andijan-36) were 0.1; It was found that the moisture content was 1.0; 0.7%; 1.0; 1.0; 3.0%; 00/01; 00/01; 00/02% lower, but the moisture content was 0.5; 0.1 and 0.1% higher.

In the variants (4 and 9) grown on the background created when cotton varieties were applied at the rates of N–60, P_2O_5–90, K_2O–60 kg/ha after repeated sowing of soybean, the seed germination energy was 94.8–93.1; 93.2–93.1; 93.8–92.1%, germination was 97–95; 95–94; 94–90 and maturity was 96/4–97/16; 95/12–93/12; 95/12–92/16%, and finally the moisture content was 7.6–7.6; 7.2–7.1; 7.1–7.6%. The averages of these indicators were proportionally higher than the control by 1.9–1.3%; 2.4–1.0%; 1.0/0.0–1.0/0.0% higher, and moisture content was 0.1–0.2% lower.

It should be noted that all indicators obtained from the post-harvest treatment of soybean were slightly lower than those of cotton. Relatively lower indicators were obtained against the background created when soybean was applied at the rates of N–90, P_2O_5–90, K_2O–60 kg/ha.

However, it was found that, regardless of the type of repeated crop, the quality indicators of the seed improved as a result of the optimization of soil fertility compared to cotton after winter wheat.

CONCLUSION

In light gray soils, when medium-fiber cotton varieties were grown in areas without repeated crops, slightly better results were obtained from the initial seed quality indicators. In our experiment, it was found that in order to improve the quality of the seeds of the Andijan-36 and Navruz varieties, the highest results were obtained when mineral fertilizers were applied to mung beans planted after winter wheat at the rates of N–25, P_2O_5–80, K_2O–60 kg/ha and to soybeans at the rates of N–60, P_2O_5–90, K_2O–60 kg/ha.

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