

SHADOW - AS AN ENVIRONMENTAL INDICATOR FOR INCREASING SOIL FERTILITY

Maxambetiyarova Aynash Dauletbay kizi

*Karakalpak Institute of Agriculture and Agrotechnologies, Assistant of the
Department of Plant Growing, Forestry and Landscape Design*

Abstract. This thesis highlights the impact of soybean cultivation as a secondary crop on soil fertility and the agro-ecological state of irrigated lands. The biological properties of soybeans, the absorption of atmospheric nitrogen by tuber bacteria in their roots, and the impact of nitragin application on plant growth and yield were analyzed. The study examined the effectiveness of applying various nitrogen rates and nitragin when growing soybeans as a secondary crop after winter wheat. The results show that the rational use of biological nitrogen sources along with mineral fertilizers in soybean cultivation is of great importance in maintaining and increasing soil fertility.

Keywords: soybean, soil fertility, ecological indicator, secondary crop, nitragin, nitrogen, tuber bacteria, agroecology, irrigated soil.

Introduction

Today, one of the important tasks in agriculture is the efficient use of land resources, the preservation and enhancement of soil fertility, and the implementation of environmentally sustainable agricultural technologies. In particular, it is possible to increase production volumes by effectively utilizing the possibility of growing several crops per year on irrigated lands.

Leguminous crops, including soybeans, are of particular importance in increasing soil fertility. Nodule bacteria that live a symbiotic life in soybean roots have the ability to biologically absorb molecular nitrogen from the atmosphere. Therefore, soybean is valued not only as a source of high-protein grain but also as an important crop that serves to improve the nitrogen balance in the soil.

Purpose and objectives of the research.

The main goal of the study is to determine the effectiveness of using mineral nitrogen fertilizers and nitraginine in the cultivation of soybeans as a secondary crop after winter wheat under the conditions of meadow-alluvial soils in the desert zone of Uzbekistan.

The research objectives are as follows:

- study the possibilities of cultivating soybeans as a secondary crop;
- determine the influence of various nitrogen norms on the growth and development of soybeans;

- evaluation of the effectiveness of seed inoculation with nitrugin;
- determination of the effect of mineral fertilizers and biological preparations on soybean yield;
- assessment of the impact of soybean cultivation on soil fertility from an environmental perspective.

Research results

The research was conducted in the conditions of meadow-alluvial soils in the desert zone of Uzbekistan. After the winter wheat harvest, soybeans were grown as a secondary crop on the cleared areas.

In the experiments, nitrogen fertilizers were applied to soybeans at rates of N30 and N100 kg/ha, and the effectiveness of seed treatment with nitrugin was studied. According to the research results, a high soybean grain yield of 1.59 t/ha was obtained under the conditions of inoculating soybean seeds with nitrugin strains and applying mineral fertilizers at a rate of N30P120K100 kg/ha.

The results obtained show the importance of the effective use of biological nitrogen sources in soybean cultivation, along with the application of high rates of mineral nitrogen fertilizers. As a result of the activity of nodule bacteria in seeds treated with nitrugin, the plant's nitrogen supply is improved. This can serve to partially reduce the need for mineral nitrogen, maintain the balance of nutrients in the soil, and ensure the stability of the agro-ecosystem.

The positive impact of soy on soil fertility is linked to its biological properties. As a leguminous crop, soybean forms a symbiosis with nitrogen-fixing microorganisms in its roots. As a result, a portion of atmospheric nitrogen is absorbed by the plant. The presence of plant residues in the soil can serve to increase the amount of organic matter and improve the biological activity of the soil.

From this perspective, soybeans can be evaluated as an ecological indicator of soil fertility. At the same time, the growth and development of the plant, the formation of tuber bacteria, and productivity indicators serve as important indicators of soil nutrient supply and agro-ecological conditions.

Conclusion

Cultivating soybeans as a secondary crop after winter wheat on irrigated lands allows for the efficient use of land resources and increases the volume of grain production. One of the important agro-ecological features of soybean is the formation of symbiotic relationships with nitrogen-fixing tuber bacteria in its roots. According to the research results, a grain yield of 1.59 t/ha was obtained as a result of inoculating soybean seeds with nitrugin and applying fertilizers at a rate of N30P120K100 kg/ha. This method demonstrates that combining biological and mineral nutrition is effective in soybean cultivation.

In general, the cultivation of soybeans as a secondary crop is one of the agro-ecological approaches that serves not only to obtain high-protein grain but also to activate biological processes in the soil, improve nitrogen balance, and maintain soil fertility.

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