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CULTIVATION TECHNOLOGY WITHIN AN ORGANIC AGRICULTURAL EXPLOITATION IN ARAD COUNTY

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Abstract:

Organic farming represents a sustainable direction for reducing environmental impact and for producing healthy food. It makes a major contribution to sustainable development, to the growth of economic activities with high added value, and to increasing interest in rural areas.

The present paper aims to evaluate the soil characteristics within the studied organic agricultural holding, as well as to establish ecological methods for conserving soil fertility and enhancing its productive capacity. On the farmland of the holding, an assessment was carried out regarding the limiting factors of soil fertility, its constraints, and nutritional characteristics.

Within the farm, the basis of fertilization is the use of organic fertilizers. Additionally, products accepted in the organic farming system have been incorporated into the soil; these products help to efficiently fix elements such as nitrogen, potassium, and phosphorus due to their content of bacterial strains, and they also mobilize certain essential microelements.

The crop rotation includes perennial and annual legumes, which contribute to increasing the organic matter content of the soil, improving its structure, and enhancing its water retention capacity. Plant residues are chopped and incorporated into the soil, which in turn increases the organic matter content and plays an important role in the synthesis of organic compounds that are part of the humus composition

• Introduction

The use of ecological methods to restore soil fertility leads over time to an improvement of the physical chemical characteristics of the soil (humus content, pH, aerohydric regime, etc.).

Among the objectives of the European Union regarding the achievement of good soil health, in the medium term until 2030, we mention the reduction of nutrient losses by at least 50%, the general level of use and risk of chemical pesticides by 50% and the use of 50% more dangerous pesticides by 2030

Soil is home to over 25% of all biodiversity on the planet and is at the base of the food chains that feed humanity and, above all, biodiversity

• Material and method

Agrochemical mapping works were carried out on the perimeter of the holding in order to evaluate the pedo-agrochemical conditions

In the 2023-2024 agricultural year, wheat, sunflower and soybeans were sown in an ecological system

In order to correct the aerohydric regime, a scarification was performed and the preparation of the germinal bed was carried out by a passage with a heavy disc. Before sowing, a pass is made with the combinator with the arrow blade (goose paw) with an important role in combating weeds

The degree of weeding is a problem in wheat cultivation in the ecological system, it can lead to high harvest losses of up to 60%. Optimum density, crop rotation, blind seeding, are the main factors to consider in reducing the degree of weeding

Soil fertility is also done by introducing a leguminous crop in rotation. In the first year after the legumes, the wheat crop is established because it has high requirements for nutritional resources

Vegetable remains are chopped and incorporated into the soil, leading to an increase in the content of organic matter, having an important role in the synthesis of the organic compounds that make up the humus

Results and discussions

The content of organic matter (humus) in the soil falls within the limits of an average insurance state (2.5 - 4.00 %) The soils analyzed in this work are medium supplied with nitrogen (2.5 - 1N - 4.00). The reaction of the soil is slightly acidic
Very good organic matter content at the surface and good in depth, loamy texture, the presence of macroporosity with good vertical continuity causes excess water to easily percolate along the profile
A major importance is the controlled application of nutrients, in such a way as to ensure the optimal use by the crop plants of the nutrients existing in the soil and of those applied annually in accordance with the needs and requirements imposed for the protection of water and soil quality

The productivity of the land is decisively influenced by a correct rotation. The ratio between the crops indicates the way of using the land, the arrangement of the crops on the land within a year.

Crop rotation within the agricultural holding

ANUL 2023	ANUL 2024	ANUL2025	ANUL2026
rapita	grau	soia	floarea soarelui
soia	floare	grau	rapita
grau	soia	grau	rapita

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Poultry manure with straw was administered with a content of 410 mg/kg NO₃, 770 mg/kg NH₄, 42 mg/kg P and 7300 mg/kg K, Soy, as the preceding plant, has an important role in preserving soil fertility because it leaves up to 120 kg/ha in the soil, leading to a significant decrease in energy costs for the next crop

For wheat, the average production in the ecological system is 3900 kg/ha with a protein content of 11-13% and hectoliter mass up to 85 .

Vegetable remains are chopped and incorporated into the soil, leading to an increase in the content of organic matter, having an important role in the synthesis of the organic compounds that make up the humus

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An average production of 1,500 kg/ha was obtained for soybeans and an average production of 2500 kg/ha for sunflowers.

• Conclusions

- Following the interpretation of the data, ameliorative measures were established to correct some limiting factors of soil fertility through fertilization, works to correct the aerohydric regime and correct soil acidity.

- The production capacity of an agricultural holding depends decisively on a correctly planned and consistently executed rotation.

- By using ecological methods to restore soil fertility, the plants contain a smaller amount of nitrates, compared to those where chemical fertilizers with nitrogen were used, which gives a superior biological quality

- In the evaluation of the nitrogen reserve in the soil, it is taken into account, in addition to the nitrogen from the introduction of leguminous soils (soy), and the nitrogen from the incorporation of plant residues.

Acknowledgement: