The Role of Grain and Legume Crops in Increasing Soil Fertility in the Republic of Karakalpakstan

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Abstract: The article was scientifically analyzed a large number of nutrients in the treated layers of soil (0-30 cm) at maturity effect of soy, according to the study systems of cotton and soybean in rotation of crops on the territory of the Republic of Karakalpakstan. The increase in the amount of humus by 0.002% - NH₄ by 0.7 mg/kg and N-NO by 0.3 mg/kg at the end of the season relative to the primary agrochemical indicators of soils was scientifically justified.

Keywords: sunflower, corn, sesame, rice, soy, mineral fertilizers, standards, development

1. Introduction

Maintaining and increasing the productivity of irrigated lands is one of the main problems for all regions of the country. This is due to the fact that today in our irrigated soils such negative processes as salinization, erosion, pollution, humus and nutrient depletion are developing.

After gaining independence, the first President Islam Karimov personally paid special attention to the radical reform of agriculture to meet the demand of the population for grain and grain products. Proof of this is the decision of the Cabinet of Ministers No. 413 of 1997 and No. 344 of 1998 and the establishment of a research institute of grain and legumes on irrigated lands and its branches in each region.

In addition, in order to further increase the volume of food production in the country and increase their variety and on this basis to fully meet the demand for food, increase incomes and living standards of the rural population, the President signed a decree on October 20, 2008. The Decree "On measures to optimize and increase their production” has played an important role in meeting the needs of the population in food products, increasing rural incomes and welfare.

In the section on modernization and accelerated development of agriculture (3.3) of the Action Strategy on development and livelihoods. Karakalpakstan for 2017 five priority areas of development of the Republic of Uzbekistan were set, including development of agriculture, modernization and accelerated development of the reclamation of irrigated lands, development of a network of land reclamation and irrigation facilities, introduction of intensive methods of agricultural production, first of all, modern agrotechnologies that save water and resources, use of high-yielding agricultural machinery; expansion of research work on the creation and introduction into production of new selection varieties of agricultural crops resistant to diseases and pests, adapted to local climatic and environmental conditions, as well as high-yielding animal breeds; particular attention is paid to taking systematic measures to mitigate the negative impact of global climate change and the drying up of the Aral Sea on agricultural development and livelihoods.

To this end, our main goal is to scientifically and practically substantiate the impact of optimal fertilizer rates on cotton yields after past grain and legume crops planted to increase soil fertility in the Aral Sea region of the Republic of Karakalpakstan.

In the conditions of the Republic of Karakalpakstan, the considered northern region has not sufficiently substantiated the timing of the use of mineral fertilizers and the norms for the care of crops in the crop rotation system. Therefore, it remains relevant to determine the direction of change of processes in soils (agrochemical, agrophysical and reclamation) in this region.

It is especially considered an important task to develop acceptable standards for the use of mineral fertilizers for obtaining a high cotton crop sown after the main sowing crops, for example, like sunflower, corn, sesame seeds, rice, soybeans, etc. Because, in any soil and climatic conditions, crop rotation and agricultural production technology do not only affect the agrophysical qualities of soils, but also all other qualities, for example, as agrochemical and meliorative [4,5,6].

Therefore, we set ourselves the goal of scientifically substantiating the effect of acceptable mineral fertilizers on cotton fertility after sowing leguminous crops sown to increase soil fertility in the Republic of Karakalpakstan in the Aral Sea region. That is, an experiment was conducted on an acceptable, fertilizing system of cotton sown one year after sowing crops such as winter wheat, corn, sesame and soybeans in the meadow alluvial soils of the region.

2. Methods of Research

Research methods were performed by conducting field experiments. The experiment, phenological observations, sampling from soils and plants were carried out on the basis of the methods of “Field experiment methods” (Dospekhov, 1985), “Method of the State variety of crop testing” (1964) and “Field experiment methods” (2007).
The degree of which the problem has been studied.
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(2017) have conducted a number of scientific studies on
various factors by a number of brilliant scientists and have
given the necessary practical recommendations for
production.

3. Basic Results

In the proved experiment were planted varieties of wheat
"Krasnodar-99", soy "Orzu", sesame "Karshiga" and
podsolnukha "KK-60".

In order to determine the effect of sowing crops on humus
and the active form of NPC in the soil composition, in
the experiments we analyzed the amount of exchange potassium
and active phosphorus, humus, nitrate and ammonium
nitrogen in the soil layers according to the options before
sowing and at the end of the period of validity of these
crops.

Agrochemical analyzes of samples taken from the soil
before the experiment show that in the depth of 0-30 cm soil
layers (treated) humus is 0.797%, N-NH4 -10.2 mg / kg, N-
NO3 - 7.3 mg / kg, active P2O5–28 mg / kg and exchange
K2O esa –118 mg / kg.

The obtained agrochemical analysis shows that the degree of
provision with nutrients in the soils of the experiments is
considered low.

In the variant of sowing wheat at soil depths (cultivated) of
0-30 cm, the amount of humus is 0.788%, N-NH4 -10.2 mg / kg,
N-NO3-7.3 mg / kg.

That is, in relative analyzes before sowing (2018 -2019) in
soil layers 0-30 cm (cultivated) in the variant of sowing
winter wheat, the amount of humus was 0.009%, and the
amount of N-NH4 decreased by 0.4 mg / kg, N-NO3 - 0.2
mg / kg.

But the highest decrease in nutrients was observed in the
variant of sowing corn; according to the initial data, in the
soil layers of 0-30 cm, humus was 0.782%, -NH4 -8.7 mg / kg,
N-NO3 - 6.8 mg / kg.

This shows that in maize, the absorption of nutrients from
the soil is higher compared to other crops.

According to the initial data, in the variant of sowing sesame
seeds in the soil layers, the amount of nutrients is reduced,
but the form of nitrogen is increased by 0.2 mg / kg
compared to the initial amount. This situation is
characterized by a change in the form of nitrogen.

In the variant of soybean sowing, the above analyzes are
observed. That is, at the end of the validity period, in the soil
layers of 0-30 cm, the highest amount of nutrients is
observed (the amount of humus is 0.799%, N-NH4 -10.9 mg
/ kg, N-NO3 –7.6 mg / kg).

These figures show that, relative to the initial data, the
amount of humus increases by 0.002%, and N-NH4 by 0.7
mg / kg, N-NO3 by 0.3 mg / kg.

We will comment on such a state that this type of culture, in
comparison with other species, not only preserves nutrients
in the soil, but with the use of suitable agricultural
techniques can affect the increase in soil fertility.

4. Findings

1) Agrochemical analyzes of samples taken from the soil
before the experiment show that in the depth of 0-30 cm soil
layers (treated) humus is 0.797%, N-NH4 -10.2 mg
/ kg, N-NO3 - 7.3 mg / kg, active P2O5–28 mg / kg and exchange
K2O is –118 mg / kg.
2) In the variant of sowing wheat at soil depths (cultivated)
0-30 cm, the amount of humus is 0.788%, N-NH4 -10.2
mg / kg, N-NO3-7.3 mg / kg.
3) In the variant of sowing sesame seeds in the soil layers,
the amount of nutrients is reduced, but the form of
nitrogen is increased by 0.2 mg / kg compared to the
initial amount.
4) In the option of soybean sowing at the end of the
validity period, in the soil layers 0-30cm the highest
amount of nutrients is observed (the amount of humus is
0.799%, N-NH4 -10.9 mg / kg, N-NO3 –7.6 mg / kg).

References

[1] Методы агрохимических, агрофизических и
микробиологических исследований в поливных