AGROCHEMICAL COMPOSITION OF RAINFALL AND IRRIGATED SHALE SOILS

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Abstract:The article presents the agrochemical composition, nutrient distribution dynamics and fertility properties of protected and irrigated gray soils. The amounts of humus, nitrogen, phosphorus and potassium in the genetic layers of protected and irrigated light, typical and dark gray soils are determined and their differences are revealed. At the same time, the dynamics of nutrients in soil layers is revealed through geochemical spectra.

Keywords:reserve, irrigated gray soil, nutrients, migration, geochemical spectrum.

In most regions of the world, the problems of managing the amount and balance of chemical elements in soils, conducting organic farming from the perspective of environmental cleanliness, and conducting scientific research to identify various changes in soils, prevent negative processes in them, and increase productivity are among the pressing issues of today.

As is known, the agrochemical characterization of soils takes into account the quantity and quality of nutrients in the soil, their distribution along the soil profile,

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spatial and temporal differentiation, and the differentiation of mobile and total amounts in the soil.

The total and mobile forms of nitrogen, phosphorus, potassium and microelements in the soil, soil reaction, the amount of humus and absorbed bases, etc. determine fertility. One of the important agrochemical indicators is humus, which contains a certain amount of nitrogen, phosphorus and individual macro- and microelements.

Agrochemical characterization of soils serves as a scientific basis for fertilizing agricultural crops. The main agrochemical indicators of soils vary widely depending on the types, types, types and methods of cultivation of soils, the degree of their erosion, their development and irrigation. The use of mineral and organic fertilizers is the basis of agricultural production and nutrient cycling [1]. The effectiveness of organic and mineral fertilizers also depends on the introduction of industrial and innovative technologies.

The increase in soil fertility and the increase in plant productivity are determined by agrochemical indicators. The concept of any plant is the basis of the life of any organism. Soil is the main source of providing plants, especially agricultural crops, with nutrients and humus, providing them with various complex stimulants. In natural, that is, protected conditions, humus performs the function of uniform distribution of nutrients, it is precisely responsible for the distribution of mobile nutrients and heavy elements [2]. With a lack of humus, the loss of nutrients in various ways increases.

In the conditions of the foothill zone in the north of the Fergana Valley, soil formation factors have led to the formation of dark, typical, light gray soils with potential fertility. The humus content in these soils varies widely. As a result of long-term natural, that is, natural selection, a dynamic equilibrium is established in natural landscapes, in which soil properties correspond to the biological properties of the phytocenosis from an ecological point of view.

The main organic matter of the soil in all types and subtypes of soils is humus [3]. According to the VVDokuchaev Institute of Soil Science: if the yield is considered 100% when the humus content is 3-4%, then at 2-3% it decreases to 80-90%, that is, the yield loss is 10-20%, at 1.5-2% the humus content decreases to 75-80%, in other words, 20-25% of the yield is lost, at 1.5% humus the yield loss is 40-45%. Improving the quality and productivity of the soil is the main condition for irrigated agriculture. Currently, a negative balance of humus is recorded almost everywhere, in almost all agricultural zones. In many years of experience, it was 22%, and in chestnut soils it was 13%.

Deep plowing and irrigation in the early stages increase the loss of humus. According to long-term data of scientists, humus is replenished due to root and shoot residues, the amount of which is 30-45 s / ha after grain crops, and 60-80 s / ha after perennial grasses. The humification coefficient depends mainly on the state of the soil and soil-climatic conditions, and is approximately 30-33% of the mass of the initial organic residues.

The decomposition of soil organic matter, i.e., mineralization processes, leads to the synthesis of humus and other substances. Dry and irrigated gray soils develop in geomorphological conditions determined by the concepts of submontane accumulative plains and upper river terraces.

The changes in the amount and quality of humus in the soil as a result of the development of protected lands and the increase in the level of development of developed lands have been studied by many scientists, and it has been found that with an increase in the level of soil development, the amount of humus initially decreases and then increases. In addition, the agrochemical and geochemical properties of soils are presented in the scientific works of AI Perelman [4], MAGlazovskaya [5], G. Yuldashev [6, 7], MM Khaydarov [8] and many other scientists [9].

Field and laboratory soil studies were conducted using the morphogenetic method of VVDokuchaev. Agrochemical and agrophysical soil analyses were

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conducted according to the methodology specified in the manual "Methods of agrochemical, agrophysical and microbiological studies in irrigated cotton regions".

Dark gray soils have a darker gray color throughout their genetic profile, especially in the turf-humus horizon, with a relatively fine-grained structure, followed by a denser horizon with a brown-gray transitional humus-carbonate, with white pores in the layer.

The morphological characteristics of typical and light gray soils are approximately the same, in which the above-mentioned characteristics are less pronounced. As for the content of humus, dark gray soils are richer than light and typical gray soils. In the turf layer, it is 4.01%, then a sharp decrease is observed and varies in the range of 1.58-2.88%.

As for the total nitrogen content, its amount depends on the amount of humus. In the upper layers of the soil, the total phosphorus content is in the range of 0.161-0.220%, and the potassium content is in the range of 2.05-2.45, which has the highest values.

The mobile forms of phosphorus and potassium are in the same state, their content in the upper layers of dark gray soils is 36.8; 404 mg/kg, respectively. The content of carbonates along the profile is 3.81-10.15, with maximum values in the 73-101 cm horizon, depending on the total content of carbonates, calcium and magnesium carbonate salts $CaCO_3$ and $MgCO_3$ in the upper horizons are 1.71 and 0.78%, respectively.

Similar changes are observed in other sub-types of soil, but they are less pronounced and have smaller values, except for the slowly increasing calcium and magnesium carbonate salts. In other sub-types, their maximum values occur on light gray soils of the sub-type.

Irrigated gray soils occupy the main place in the agriculture of our republic. Therefore, its area is increasing at the expense of loamy gray soils. However, irrigation

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leads to significant changes in the agrochemical properties of the soil. In particular, irrigation of sheltered, typical, light-colored and dark gray soils leads to the loss of humus and total nitrogen. For example, if the humus content in the 0-73 cm layer of dark gray soils was 4.01-0.71%, then after 30 years of irrigation this indicator fluctuates within 2.1-0.96% at these depths. In typical sheltered gray soils, the humus content in the 0-6 cm layer was 2.78%, and in parent rocks - 0.21%. These indicators fluctuate between 1.37 and 0.15% in light gray soils (Figure 1).

Figure 1.Amounts of humus and total nitrogen, phosphorus, and potassium in gray soils

As can be seen from the above, the dark gray soils of the reserve are the richest in humus, then this row is occupied by typical gray soils, and light gray soils complete it. As can be seen from these data, there is no novelty, that is, a similar situation was obtained by other authors. After calculating the total humus reserve in the 0-100 cm layer of reserve and irrigated soils, an interesting picture is observed. In many materials it is written that gray soils lose their humus during irrigation. We will consider this situation in our examples. In dark, relatively high-humus soils, the total humus content in the 0-100 cm layer of the protected dark gray soils after 30 years of irrigation was 160.0 t/ha, while after 30 years of irrigation it was 144.8 t/ha, i.e., the humus loss was clearly evident, amounting to 15.2 t/ha and about 10% compared to the initial one.

A different picture is observed in typical irrigated and light gray soils. In typical dry gray soils, the total humus content was 102.6 t/ha, and after more than 50 years of irrigation, it was 115.2 t/ha. These data are somewhat lower in light gray soils, i.e., in dry soils, the humus content was 52.88 t/ha, and in irrigated soils, it was 88.62 t/ha after more than 55 years.

On typical gray soils, the increase in humus due to irrigated farming is 12% compared to the initial one, while on protected gray soils it is 67% compared to the

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initial one. This leads to the conclusion that the more initial humus, the less it is added after long-term irrigated farming, and the less humus, the more its addition will be when the land is used for a long time in the irrigated farming system. Therefore, the effect of irrigated farming on increasing the humus content in the soil increases with a decrease in the initial humus content in the soil.

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