

Soil Properties and Their Influence on Fertilizer Efficiency

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Abstract: This article provides information about organic and mineral fertilizers, and methods of increasing crop productivity using these fertilizers are shown.

Keywords: chemicalization, fertilizer, soil, fertility, organic, inorganic, mineral, phosphorus, potassium.

The program of comprehensive development of agriculture is being implemented in our country. This program envisages a significant increase in the production of agricultural products in order to fully satisfy the population with food products and the industry with raw materials.

It is the basis of increasing the yield of agricultural crops, improving the quality of the obtained products and increasing the soil fertility. Fertilizer is the main factor in increasing productivity. Fertilizer application is beneficial from an economic point of view.

One of the strong factors of intensification is to increase the chemical and physical properties of the soil and its productivity by supplying agriculture with chemical fertilizers. At least 50-60% of the productivity of agriculture in all countries of the highly developed world is due to the use of fertilizers.

Today, the main task of agriculture is to use fertilizers more rationally, to increase its efficiency by switching from new methods of fertilizing crops to a scientifically based system.

Soil is a complex system of organic and inorganic substances that directly and indirectly supports plant and animal life. Consists of minerals, nutrients, water, microorganisms, and decaying living matter that provides essential elements to support growth. Soils of different geographical regions differ in chemical composition, structure, pH value, structure and color. Soil is the basis of the ecosystem and performs the functions necessary for the existence of living matter. Fertilizers are a very powerful factor in increasing soil fertility and yield. Because with the help of fertilizers, first of all, the soil is enriched with humus, nitrogen and other gray elements. As a result, the yield of agricultural crops increases and their quality improves. In order to correctly use mineral fertilizers according to the composition of the soil and to determine the reserves of nitrogen, phosphorus and potassium that can be absorbed by the plant, a cartogram is created that shows how well the soil is supplied with these elements. Based on this cartogram, the period, method and norm of applying mineral fertilizers to the ground are recommended.

Mineral fertilizers applied to the soil do not remain as they are, that is, they change. In all regions of Uzbekistan, superphosphate, which is highly soluble in water, turns into a water-insoluble compound after falling into the soil on carbonate soils. Although such superphosphate is well absorbed by the plant, it remains in the place where it fell, and does not spread to the soil layers along with water. Due to the fact that superphosphate becomes insoluble in water and does not move from the place where it is placed, plant roots can benefit from it less, because

superphosphate does not fall into the root layer. Due to the fact that phosphate interacts with the soil for a long time, it changes from a form that can be easily absorbed by the plant to a form that is absorbed less and less.

When nitrogen fertilizers fall into the soil, its changes are different. In all growing regions of Uzbekistan, various nitrogenous substances added to the soil quickly turn into nitrate, i.e., water-soluble form, under the influence of microbiological activity. When the land is irrigated or there is rain, nitrate is washed down to the lower layers of the soil, after a while, as a result of the part of the nitrate not absorbed by the plant being washed away or being squeezed into the top layer of the soil, there is a large amount of gross phosphorus in the soil. Regardless, it is greatly reduced in the root layer. This situation limits the plant's use of nitrogen fertilizer.

Therefore, in order to improve the plant's use of fertilizers, it is necessary to create all the conditions that improve the movement of phosphorus in the soil, prevent its chemical combination and the rise of nitrate to the surface. In order to achieve this, it is necessary to work the land well. Capillaries (tubes) are less in soil that is always kept soft. Compared to compacted soil, salts rise to the surface much less. In addition, one of the measures to create these conditions in the soil is to increase the microbiological activity in the layer of the soil where the fertilizer has fallen.

As a result of decomposition of organic substances (manure, manure, peat) in the soil, microorganisms absorb more nutrients, that is, the process of biological assimilation takes place. After the death of these microorganisms, they quickly rot and turn into nutrients that are easily absorbed by the plant. Thus, when a mixture of organic and mineral fertilizers is applied, the plant uses nutrients well, and the cotton yield increases.

By now, most of the irrigated lands of most regions of Uzbekistan (60%) are saline to a certain degree.

Depending on the amount of salt in these areas, they are divided into slightly, moderately and strongly saline areas. More than half of the saline lands are moderately and strongly saline. Depending on the amount of water-soluble salts (chlorine and sulfuric acid) in the root layer of the soil, the level of salinity of the soil is determined.

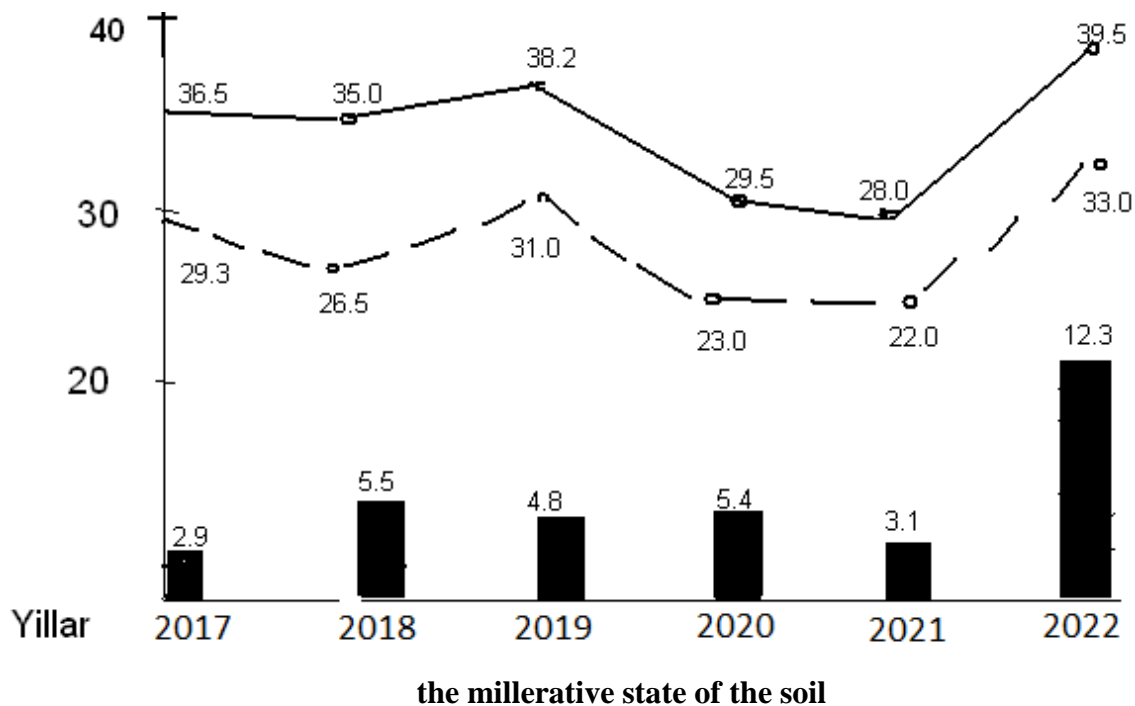


Figure 1. Changes in cotton yield depending on the melioration condition of the applied fertilizer.

when fertilized 2- when not fertilized

Bringing the soil salinity to the level where the plant can grow and develop depends on the presence of salts in it and the composition and ratio of these salts. Nevertheless, all crops develop well only when the concentration of salt is low.

Fertilizer effectiveness is greatly reduced in saline soils with unsatisfactory melioration conditions. As the salinity of uncultivated land, which was previously not fertilized with organic fertilizers, and the salinity of old cultivated land, the additional yield obtained due to mineral fertilization will decrease. Fertilizer applied to saline, but well-washed land gives better results. Experiments show that the effect of mineral fertilizers increases on land with improved melioration.

Today, in order to improve the melioration condition of these saline lands, ditches and zaburs, which have not been dug for many years, are being dug and the salt of the land is being washed away. This improves the properties of the soil and gives good results when fertilizing.

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