

IMPORTANCE OF MINERAL FERTILIZERS IN THE CULTIVATION OF LEGUMINOUS PLANTS IN THE LIGHT GRAY SOILS OF SOUTHERN FERGANA AND THEIR EFFECT ON THE CHANGE OF AGROCHEMICAL PROPERTIES OF THE SOIL

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Abstract: *This article is written about the nutrition of leguminous plants in the soil environment of Southern Fergana region, as well as the difference between the nutrition of other types of plants from the nutrition of leguminous plants and the norms of nutrition.*

Key words: *soil, erosion, mineral fertilizer, leguminous, crop, fertile, water, air, fertilizer, nitrogen, ammonia, protein*

INTRODUCTION

Mineral fertilizer refers to salts and other inorganic, industrial and mineral products, which contain elements necessary for the development of plants and increase soil fertility, which are used for stable and high yield. More than 70 chemical elements are involved in the formation of plant tissue, its growth and development. The most important of them are carbon, oxygen and hydrogen, which make up 90% of the plant's dry mass, and nitrogen, phosphorus, potassium, magnesium, sulfur, sodium, calcium make up 8-9%. These ten elements are called macronutrients. The remaining 1-2% consists of iodine, boron, iron, copper, manganese, zinc, molybdenum, cobalt, etc. These are present in plants in very small amounts (0.001-0.0001%). That is why they are called micronutrients. Plants get most of these elements carbon, oxygen and hydrogen from air and water, and the rest from the soil. Most of the elements received by the plant do not return to the soil, they are taken out with the crop. For example, 1 ton of corn takes 14 kg of nitrogen, 2.5 kg of phosphorus, 3.5 kg of potassium, and 1.5 kg of sulfur from the soil. Most of the soil elements are washed away by water and interact with the soil components so that the plant cannot absorb it. As a result, there is a shortage of plant nutrients on cultivated land, and soil fertility decreases. If these lost elements are not replenished by applying fertilizers to the soil, the yield will decrease sharply. That is why much attention is paid to fertilizer production. Thanks to the use of fertilizers, it will be possible to increase the yield of agricultural crops by 50-60%. For example, about a quarter of the food on our planet, and half of the cotton, is obtained only in exchange for fertilizers. Nutrient elements in fertilizers, especially nitrogen, play a major role in mineral nutrition of plants. It is part of protein and nucleic acids. Nitrogen is also part of chlorophyll, a substance that enhances the process of photosynthesis in plants. Which is, plants use it to synthesize organic substances from inorganic substances.

RESULT AND DISCUSSION

Nitrogen element is included in protein, which is the basis of plant and animal world, and chlorophyll substances necessary for life. Natural compounds of nitrogen in the soil cannot fully satisfy the plant's need for nitrogen. Therefore, it is necessary to regularly fertilize the soil with nitrogen fertilizers. Among the nitrogen fertilizers, sodium nitrite NaNO_3 , potassium nitrate KNO_3 , calcium nitrate $\text{Ca}(\text{NO}_3)_2$, ammonium nitrate NH_4NO_3 , ammonium sulfate $(\text{NH}_4)_2\text{SO}_4$ and urea $\text{CO}(\text{NH}_2)_2$ are nitrogen that can be assimilated by plants and are good in water. are soluble compounds. These are solid fertilizers. Nitrogenous liquid fertilizers contain a lot of nitrogen. For example, liquid ammonia contains 82% nitrogen, ammonia (solutions of ammonium salts - ammonium nitrate, calcium nitrate, etc. in ammonia) contains 35-45% nitrogen.

Phosphorus plays a major role in the respiration and reproduction of plants. It includes substances (enzymes, vitamins, etc.) that are important for the life of the plant. In particular, it is part of complex protein-nucleoproteins found in seeds. Chromosomes, which store genetic traits and transmit them from generation to generation, are composed of nucleoproteins. Phosphorus plays a key role in grain yield of grain crops. It increases the resistance of plants to cold and drought and has a positive effect on the increase of basic substances. For example, it increases starch in potatoes and sucrose in sugar beets.

Potassium plays an important role in correcting vital processes in the plant. It improves the water regime in the plant, participates in the formation of carbohydrates and metabolism. The dry plant stem contains up to 4-5% potassium, and the ash left from burning leaves contains up to 30-60% potassium.

Mineral fertilizers are mainly used in agriculture to increase productivity. The second main area where fertilizers are used is the chemical industry. Especially sodium and potassium salts, for example, Cl , KCl s. Soda, hydrochloric acid, potash, caustic sodium, caustic potash are raw materials for production. Na_2SO_4 is a raw material for the production of glass, sodium sulfide, fluoride, potassium and sodium dichromate, and sodium phosphate.

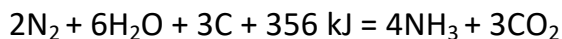
In the field of metallurgy, fertilizers are used in ore enrichment, metal liquefaction, metal extraction by electrolysis, metal surface treatment, metal and alloy welding. In particular, sodium sulfate is the main raw material for glass production.

Fertilizers are divided into classes depending on their origin, field of application, composition, properties, and methods of production. All fertilizers for two:

- 1) directly (used for plant nutrition);
- 2) indirectly (used for chemical soil improvement, pH correction) divided into fertilizers.

Depending on the origin, fertilizers are divided into mineral, organic, organo-mineral and bacterial fertilizers. Mineral fertilizers are mainly mineral salts (but also include organic matter urea). Organic fertilizers include manure, peat, green plants, compost, feces, etc. Bacterial fertilizers contain microorganisms that collect nutrients that plants can

absorb in the soil. For example, nitrogenase enzyme of nitrogenase bacteria collects atmospheric nitrogen by turning it into a compound, or phosphobacteria that decompose organic compounds make phosphorus contained in organic compounds available to plants. There are 4·10¹⁵ tons of nitrogen in the Earth's atmosphere, that is, 80,000 tons of nitrogen in the air correspond to every 1 land. This is a million times more than the amount of nitrogen released by 1 plant planted in the ground. In general, the reaction of nitrogen bacteria living in leguminous plants to fix atmospheric nitrogen can be written as follows:



In this way, up to 50 kg of bound nitrogen falls from 1 cultivated land per year. Due to lightning in the air, up to 15 kg of nitrogen falls on 1 ha of land every year. Mineral fertilizers are divided into phosphorus, nitrogen, potassium, magnesium, boron and other fertilizers depending on their composition. Depending on the number of nutrients in the composition, fertilizers are divided into two: simple or one-component (contains one element that can be absorbed by the plant) and complex (contains two or more elements).

Complex fertilizers are divided into complex and mixed fertilizers. Compound fertilizers are one chemical compound containing at least two or more plant-absorbing elements. Mixed fertilizer is obtained by mechanical mixing of simple or complex fertilizers. Fertilizers are called concentrated if they contain more than 33% of the active substance, and if they contain more than 60%, they are called highly concentrated.

Along with the 10 elements mentioned above, chemical elements such as B, Cu, Co, Mn, Zn, Mo, I are also needed in very small amounts (in microquantities). They are microelements, and fertilizers containing such elements are called microfertilizers. Now it is impossible to do without micro-fertilizers, because their use creates additional opportunities in agriculture.

Microfertilizers not only increase the productivity of plants, but also increase their resistance to diseases. Microfertilizers accelerate biochemical processes in the plant organism, increase the activity of enzymes. Increases synthesis of protein and nucleic acids, synthesis of vitamins, sugars and starch. Microfertilizers are applied up to 1 kg per 1 hectare of land.

Depending on the state of the aggregate, fertilizers are divided into solid, liquid (for example, solution and suspension of ammonia in water) and gaseous (for example, carbon dioxide) fertilizers. Fertilizers are divided into water-soluble and soil acid-soluble fertilizers, depending on the level of solubility. All nitrogen and potash fertilizers are included in water-soluble fertilizers. Plants absorb them quickly. But they quickly dissolve in soil water and are washed away. Fertilizers soluble in soil acids include most phosphates. They slowly dissolve, but remain in the soil for a long time.

Fertilization not only increases nutrients absorbed by plants in the soil, but also affects its physico-chemical and biological properties, increases soil fertility. The acidity or alkalinity of applied fertilizer affects the soil environment. For example, if fertilizers such as

$(\text{NH}_4)_2\text{SO}_4$ and NH_4Cl are systematically added to the soil, it makes the soil reaction acidic. Because the plant absorbs cations, as a result, instead of it, hydrogen ions increase (at the expense of water in the soil), and free acids (hydrochloric and sulfuric acids) accumulate in the soil. The pH of the soil changes.

On the other hand, if fertilizers such as NaNO_3 are applied a lot, OH^- ions accumulate in the soil. The soil reaction becomes alkaline.

CONCLUSION

That is why it is not enough to characterize fertilizers only chemically. They should also differ in their physiological properties, that is, in the fact that cations and anions are not used to the same extent. Depending on these characteristics, fertilizers are divided into physiologically acidic, physiologically alkaline and physiologically neutral fertilizers. The latter does not change the soil reaction.

Mineral fertilizer should not stick to each other and turn into stones when stored, should not absorb moisture, should be less hygroscopic, should have the property of scattering when applied to the soil. That is why solid fertilizers are produced in three types: powdery (the size of the particles is less than 1 mm), crystal (the size of the crystals is larger than 0.5 mm), and granular - in the form of balls (the size of the balls is larger than 1 mm).

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