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MINERAL IN THE GANJA-KAZAKH REGION EFFECTS OF FERTILIZERS ON CLAFFER PRODUCTIVITY, QUALITY AND SOIL FERTILITY

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Applicant: Khalilov Seymur Ajdar

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The dissertation work was carried out on the basis of the Experimental Production Honorary Experimental Center of the "Beekeeping" Center located in Goranboy region of the Livestock Research Institute of the Ministry of Agriculture.

Scientific adviser: -doctor of Agrarian Sciences, Associate Professor **Allahverdi Kamil Seyidov**

Official opponents: -Doctor of Agrarian Sciences, Professor, **Hasanali Asad Aslanov**
- doctor of Philosophy in Agrarian sciences, **Sahib Khudaverdi Shukurov**

- doctor of Philosophy in Agrarian sciences, **Bahruya Jamil Bagirova**

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_____ **A.G.Guliyev**

Scientific secretary of the Dissertation Council: doc. phil. biol.sci.,
_____ **Sh.C.Salimova**

Chairman of the scientific seminar: doc. of agr. sci.
_____ **M.I.Mammadov**

GENERAL CHARACTERISTICS OF THE WORK

The actuality of the subject. The “State Program for Socio-Economic Development of the Regions of the Republic of Azerbaijan in 2019-2023” approved by the President of the country on January 29, 2019 emphasizes the acceleration of economic development in rural areas, increasing agricultural products and its quality indicators1. In addition to increasing fodder production to meet the food needs of livestock, which is one of the main sectors of agriculture, the protection of soil fertility is also considered to be one of the main challenges ahead.

One of the main issues facing agrarian science is the intensification of fodder production. Thus, increasing the production of vegetable protein is of great importance in improving and developing the fodder base of livestock. In order to reduce the cost of livestock products, it is important to provide livestock with high quality nutrients, especially protein-rich feeds.

Clover is indispensable in the production of high-quality fodder rich in protein and vitamins. Clover is high-yielding and rich in nutrients, is the first step in strengthening the fodder base of livestock and plays a major role in increasing soil fertility. Clover (medicago sativa) has a rich mineral content, potential productivity and moisture content due to its nutritional value (49.3 yv per 100 kg of grass), chemical composition, protein (15.1%) and vitamin A content (up to 200 mg / kg). It is considered a unique plant because it grows in temperate-hot climates and dry steppe zones.

Clover is widely used in livestock for hay, haylage, hay flour, green fodder and other purposes. Clover root and sorghum residues accumulate 150-200 kg / ha of nitrogen in the soil, which is equivalent to applying 300-400 kg / ha of nitrogen fertilizer or 30-40 t / ha of manure to the soil. Clover improves the agrochemical, hydro-physical, microbiological properties of the soil, prevents salinization, destroys pathogens of diseases and pests and enriches the soil with organic compounds by increasing soil fertility.

Due to the biological nitrogen accumulated by alfalfa in the soil, more than twice the annual norm of nitrogen is saved, thus providing nitrogen to other crops. Therefore, given the importance of alfalfa as a strong fodder in livestock and the importance of restoring soil fertility, the study of mineral nutrition is one of the most important issues.

Subject of research. The subject of the study is the study of optimal and effective ways to develop a sustainable fodder base for livestock with the application of gray-brown soils, alfalfa, organic and mineral fertilizers.

The main goals and objectives of the study. Taking into account the urgency of the problem, the main purpose of the study is to determine the effective mineral fertilizer norms that affect the productivity, quality and increase of soil fertility of clover in the irrigated gray-brown soils of Ganja-Gazakh region.

In order to achieve the goal of the study, the following tasks are envisaged: study of soil and climatic conditions of the study area; study of agrochemical properties of experimental lands; study of the effect of application of mineral fertilizers under alfalfa on changes in soil nutrient regime and soil fertility; study of the effect of mineral fertilizers on the accumulation of total nitrogen, phosphorus and potassium in the surface mass of alfalfa; study of the effect of mineral fertilizers on clover size and development, productivity and quality; study of the effect of mineral fertilizers on the amount of nutrients entering the soil by the root mass of alfalfa and its transport; determination of economic efficiency.

Object and methods of research. The research works were carried out on the gray-brown (chestnut) lands irrigated in 2015-2018 in the following scheme with the "AzNIXI-262" variety of clover on the Experimental Production Honorary Experimental Base of the "Beekeeping" Center located in Goranboy region of the Livestock Research Institute of the Ministry of Agriculture:

1. Control (without fertilizer)
2. P90K60 (background)
3. N30 + Fon
4. N60 + Fon
5. N90 + Fon

The total area of each variant of field experiments was 144 m2 (20x7.20 m), with 15 repetitions, 15 kg of seeds were taken per hectare and sown in the second decade of September. Phosphorus-simple superphosphate (18.7%) and potassium-potassium sulfate (46%) were given in the form of 100% sub-plowing, nitrogen-ammonium nitrate (34.7%) before sowing. In the next year of the experiment, the field was irrigated in early spring and with a cross rake at a depth of 3-5 cm, and nitrogen was applied after the first harvest. Phenological observations were performed on 25 plants in 2 repetitions. Agrotechnical measures were carried out on the basis of agronomic rules adopted for Ganja-Gazakh region.

0-30 to determine nutrient reserves in the soil; 30-60; 60-100 cm, and 0-30 at the beginning and end of each year; Mixed soil samples were taken from 30-60 cm layers.

In order to determine the amount and quality of total nitrogen, phosphorus and potassium in the surface mass of alfalfa, clover samples taken from 3 places and 2 repetitions of 1 m2 area in each form were dried in moderate weather conditions, then ground to medium and determined. In order to study the mass and composition of the root part, soil samples were taken from 30x30 cm area, 0-60 cm depth, 2 repetitions and 2 places of each variant at the end of each vegetation, each was washed separately in a 2 mm diameter sieve, the roots were air dried and dry mass was determined.

In order to calculate the wet grass yield, when the area was budded by 85-90% before each harvest, an area of 15 m2 was taken from 3 repetitions and 2 places in each of the options and the wet grass mass was determined.

The economic efficiency of fertilizer application is calculated based on the cost of additional products.

In soil samples taken from the experimental field: granulometric composition was determined by NA Kachinsky, pH potentiometer, total humus was determined by IV Tyurin, absorbed bases by KK Hedroys method, absorbed ammonia by D.P. Konev method, nitrate nitrogen by Grandval-Laju. Total nitrogen and phosphorus were determined by K.E. Ginzburg and G.M. Sheglova, mobile phosphorus was determined by B.P. Machigi, and total potassium was determined by Smith. Metabolic

potassium was determined on a flammable photometer by the method of P.B. Protasov.

In plant samples: absolute dry matter in a thermostat 105° C, total nitrogen, potassium and phosphorus, according to QM Sheglova, KEGinsburg and EVVulfus, crude protein was determined by multiplying total nitrogen by a factor of 6.25, nitrates on an ionometer (EV-74) [28, p. 264; 166, c.158; 178, c.256; 224, p.311-325]. Results of field experiments, product calculation, accuracy of experiment, mathematical analysis of correlative relations, economic efficiency VNPeregudov [173, p.182], BADospekhov [125, c351], PNKonstantinov [12, p.310] and Baranov NN [115, c.433]. The main provisions of the defense: - Influence of application of fertilizers under alfalfa on soil nutrient regime, changes in soil fertility after 3 years of alfalfa, total nitrogen, phosphorus and potassium in the surface mass; - Clover height, development, productivity and quality indicators depending on fertilizer norms; -Nutrients that enter the soil with the root mass of alfalfa and are carried by the product, - economic efficiency. Scientific innovation. In the irrigated gray-brown soils of Ganja-Gazakh region, effective norms of mineral fertilizers under alfalfa have been established, productivity and its quality indicators have increased, potential and effective soil fertility has increased. The practical significance of the work. Based on the results of the study, it was determined that the application of mineral fertilizers under alfalfa has a significant impact on productivity and product quality. Thus, the application of mineral fertilizers in the norm N60P90K60 increased the yield of green alfalfa to an average of 1010.5 s / ha in 3 years, the growth was 361.5 s / ha or 56.6% compared to the fertilizer-free control option, and the amount of nitrates did not exceed the given limit (200 mg / kg in wet weight). Approbation and application of the work .. The results of the research were discussed in the scientific-technical council of the Livestock Research Institute and the scientific council of the Institute (2016-2019), in the scientific seminar of the Institute of Soil Science and Agrochemistry of ANAS (2021).

Results of field experiments In 2019, the N60P90K60 variant of alfalfa plant “AzNIXI-262” was applied on 5 hectares of irrigated gray-brown soils in Ganja Regional Agrarian Science and Innovation Center located in Samukh region of the Ministry of Agriculture of the Republic of Azerbaijan. As a result of the application of mineral fertilizers, the productivity of green alfalfa increased to 1180.0 s / ha, and the net income from fertilizers was 1222.0 man / ha.

Name of the organization where the dissertation work is carried out. The dissertation work was carried out on the basis of the Experimental Production Honorary Experimental Center of the "Beekeeping" Center located in Goranboy region of the Livestock Research Institute of the Ministry of Agriculture.

The total volume of the dissertation with a sign, indicating the volume of the structural units of the dissertation separately. The dissertation consists of an introduction, four chapters, results, 229 references and appendices. Here are the results of mathematical calculations in appendices consisting of 22 tables, 4 figures and 46 tables. The introduction to the content of the dissertation is 9 pages, 8914 characters, the first chapter is 36 pages, 70287 characters, the second chapter is 17 pages, 33235 characters, the third chapter is 18 pages, 20617 characters, the fourth chapter is 48 pages, 66357 characters, the results are 2 pages, 2814 characters, Recommendations are 1 (one) page and contain 606 characters, and the list of 229 used literature consists of 25 pages and consists of 35270 characters. The volume of the dissertation consists of 155 pages of computer writing and the total volume is 275661 characters (205803 characters excluding the list of used literature and appendices).

Personal participation of the author: Problem setting in the dissertation work, conducting experiments and relevant analyzes, analysis and generalization of the obtained results were performed by the author.

Publication: 8 articles and 5 theses reflecting the results of the research were published. 4 articles and 1 thesis were published abroad.

MAIN CONTENT OF THE WORK

The introductory part of the dissertation gives a brief description of the relevance of the work, the object and subject of research, research methods, the main provisions of the defense, scientific novelty, theoretical and practical significance, approbation and application, structure, importance for science and practice.

The first chapter provides information on the importance, botanical description, biological characteristics and cultivation technology of alfalfa.

The second chapter is devoted to the study of soil and climatic conditions of the Ganja-Gazakh region, the object of research and the agrochemical properties of the experimental lands.

The third chapter is devoted to the effect of mineral fertilizers on changes in soil nutrient regime, soil fertility and accumulation of total nitrogen, phosphorus and potassium in the surface mass.

The fourth chapter provides information on the impact of mineral fertilizers on the height, development, productivity, nutrient content, transport and economic efficiency of alfalfa.

CHAPTER I. IMPORTANCE OF BLOOD, BOTANICAL DESCRIPTION, BIOLOGICAL FEATURES AND CULTIVATION TECHNOLOGY

Due to the high nutritional value of clover (medicago sativa) contains a lot of protein, phosphorus, calcium and essential amino acids (valine, leucine, isoleucine, lysine, methionine, trionine, tryptophan, phenylalanine, arginine, histidine, pereonin, etc.). differs. There are 0.5-0.6 feed units per kg of dry grass. In addition to forming a strong root system and giving good yields, it enriches the soil with nitrogen and organic-biological substances. Clover is rich in vitamins (C, V1, V2, PP, E, K, and A). According to the absolute dry matter, alfalfa contains 18% digestible protein, 2.7% fat, 30.2% cellulose, 39.4% nitrogen-free extractives, and 9.7% ash. It also provides information on pre-sowing cultivation of the soil, preparation for sowing, duration, method and norm of sowing,

maintenance work, diseases and pests, features of harvesting, agro-techniques for sowing for seed.

The situation of studying the problem has been studied in many foreign countries and in our country. The impact of soils on soil fertility, water-physical properties, plant height and development, productivity and quality is related to research conducted in different years. The collected literature materials are briefly commented.

CHAPTER II. LAND-CLIMATE CONDITIONS OF GANJA-KAZAKH REGION, OBJECT OF RESEARCH AND AGRICULTURAL CHARACTERISTICS OF LAND OF THE EXPERIMENTAL AREA

According to Professor MM Salayev, dry, dark gray-brown soils are widespread in the Ganja-Gazakh plain. These soils are mainly dark gray-brown, gray-brown, light gray-brown, primitive gray-brown, ancient irrigated gray-brown and so on. divided into species. Light gray-brown soils are the main land fund for irrigated agriculture, mainly cereals, as well as vineyards. Light gray-brown soils are partially saline. There are also saline types of light gray-brown soils.

In order to study the agrochemical properties of the soils of the experimental field, a layer of 0-100 cm from 5 places of the field, ie 0-30; 30-60; The amount of common and assimilated forms of nutrients in soil samples taken from 60-100 cm layers was determined.

Analysis of soil samples shows that gray-brown soils are not highly supplied with assimilated forms of nitrogen, phosphorus and potassium. As can be seen from the table, the pH in the aqueous solution was 7.8 in the 0-30 cm layer, and 8.4 in the 60-100 cm layer in the lower layers. Humus, total nitrogen, phosphorus and potassium in a layer of 0-30 cm, respectively 2.13; 0.13; 0.12; Is 2.29%. However, it gradually decreased to the lower layers, 0.75 in the 60-100 cm layer, respectively; 0.06; 0.05; 1.41%. Absorbed ammonia nitrogen 5.6-18.0; nitrate nitrogen 2,5-9,7, mobile phosphorus 4,5-16,5; Metabolic potassium fluctuates between 103.4-245.5 mg / kg.

As a result of our agrochemical analysis, it is clear that due to the gradation adopted in the country (Gulahmedov AN, Akhundov FH, Ibrahimov SZ, 1980) these lands are poorly supplied with nutrients. Therefore, it is important to apply mineral fertilizers on these lands for the growth, development, high and quality yields of agricultural crops, including alfalfa, and to maintain soil fertility.

CHAPTER III. IMPROVEMENT OF MINERAL FERTILIZERS ON CHANGE OF NUTRITIONAL REGIME IN SOIL, SOIL FERTILITY AND GENERAL NITROGEN, PHOSPHORUS AND POTASSIUM CONCENTRATION IN GROUND MASS

In the first year of alfalfa, 3 harvests were carried out, and in the second and third years, 5 harvests were carried out. 0-30 at the beginning and end of the form each year; Mixed soil samples were taken from 30-60 cm layers and analyzed. In the fertilizer-free variant, ammonia absorbed in layers of 0-30 and 30-60 cm is 17.8-19.3 and 13.2-16.5 mg / kg, nitrate nitrogen is 10.5-12.5 and 6.53-8.1 mg / kg, mobile phosphorus 15.5-17.3 and 12.3-14.5 mg / kg, metabolic potassium 240.5-245.3 and 155.3-160, It was between 5 mg / kg. In both layers, the amount of nutrients increased significantly at the end of the vegetation compared to Form I, and these values were 18.3-20.1 and 14.5-17.3 mg / kg of absorbed ammonia, nit. Arat nitrogen is 11.5-13.0 and 8.2-9.8 mg / kg, mobile phosphorus is 16.8-17.8 and 13.5-14.5 mg / kg, and exchangeable potassium is 245.3 -250.3 and 158.2-163.5 mg / kg. In the case of mineral fertilizer under the clover (background) norm, the accumulation of phosphorus and potassium nitrogen compounds in the soil was significantly higher than in the control. Thus, after the first form, the absorbed ammonia in layers 0-30 and 30-60 cm is 18.8-20.8 and 14.6-17.0 mg / kg, nitrate nitrogen 12.2-13, 8 and 8.6-10.3 mg / kg, motor phosphorus 18.5-20.3 and 15.3-17.5 mg / kg, and exchangeable potassium 250.8-258.5 and 165.3 -172.6 mg / kg, ammonia and nitrate nitrogen absorbed at the end of vegetation 19.5-21.5 and 15.7-17.8; 13.5-15.3 and 10.4-11.5 mg / kg, motor

phosphorus and metabolic potassium 20.3-22.5 and 17.2-19.3; 260.5-265.8 and 170.2-175.7 mg / kg.

Together with the background (P90K60), the amount of nutrients in the soil increased significantly compared to the control and background variants due to the increasing norms of nitrogen fertilizers, and the highest amount in the N60 + Background variant was ammonia absorbed in 0-30 and 30-60 cm layers after Form I. yak 27.6-28.8 and 23.3-25.8 mg / kg, nitrate nitrogen 20.2-18.8 and 16.3-18.1 mg / kg, mobile phosphorus 25.2-26.8 and 22.7-24.1 mg / kg, exchangeable potassium 263.5-273.5 and 170.2-177.2 mg / kg, and ammonia absorbed at the end of the vegetation, respectively, 29.6-31.3 and 25.1-27.5 mg / kg, nitrate nitrogen 22.4-24.5 and 18.1-21.3 mg / kg, mobile phosphorus 27.3-29.5 and 23.4-25.2 mg / kg, exchangeable potassium was 268.4-275.6 and 177.2-182.8 mg / kg. Mathematical-statistical calculations of application of mineral fertilizers under alfalfa show that, depending on the fertilizer norms, alfalfa with green grass product (s / ha) absorbs ammonia nitrogen, nitrate nitrogen, mobile phosphorus of nutrients in the soil. and there is a high correlation between the amount of exchangeable potassium (mg / kg), and this relationship has changed over the years, in the latter form, at the end of the vegetation as follows: $r = + 0.830 \pm 0.140$; $r = + 0.880 \pm 0.100$; $r = + 0.950 \pm 0.040$.

CHAPTER IV. ECONOMIC, MANAGEMENT, ECONOMIC AND CULTIVATION OF MINERAL FERTILIZERS TO THE NECK, GROWTH, PRODUCTIVITY, NUMBER OF NUTRITIONS IN THE SOIL

The effect of mineral fertilizers on the agrochemical parameters of the soil at the end of the 3rd year of alfalfa was studied. After three years of alfalfa, the total humus content in the soil layer of 0-30 cm is 0.12%, nitrogen 0.05%, phosphorus 0.05% and potassium 0.12%. 8.7 mg / kg of ammonia nitrogen, 6.1 mg / kg of nitrate nitrogen, 14.0 mg / kg of motor phosphorus and 34.8 mg / kg of exchangeable potassium increased compared to the previous agrochemical indicators before sowing alfalfa. ¬dır. At the same

time, an increase in the amount of nutrients was observed in the 30-60 and 60-100 cm layers, respectively.

The effect of mineral fertilizers on the accumulation of total nitrogen, phosphorus and potassium in the surface mass of alfalfa was also studied in our research. It was found that under the influence of mineral fertilizers, the amount of nutrients in the surface mass of alfalfa varies according to the form. During the study, the total mass of alfalfa in the surface mass of clover under the influence of mineral fertilizers was 0.05-0.32%, phosphorus 0.03-0.12% and potassium 0.10-0.36% compared to the unfertilized variant. observed. High levels of total NPK were observed in the first form, and in subsequent forms decreased towards the end of the vegetation. In the second and third years of the alfalfa condition, the amount of nutrients in all variants was relatively high compared to the first year of the condition. This is due to the fact that alfalfa forms a strong root system and enriches the soil with nutrients. In type I, total nitrogen in the air is 2.28-2.33% of the dry matter in the fertilizer-free control variant, total phosphorus is 0.71-0.73% and total potassium is 2.21-2.31%, and at the end of the vegetation, the total NPK is 1, respectively. 78-1.83%; 0.53-0.60% and 1.28-1.71%, while P90K60 (background) variant 2.31-2.38%, respectively; 0.75-0.78%; 2.31-2.41% and 1.83-1.88%; 0.58-0.64%; 1.38-1.48%. As a result of the combined application of nitrogen, phosphorus and potassium fertilizers, the total NPK in the surface mass of alfalfa increased significantly compared to the unfertilized and (background) P90K60 variants. In the N30 + background variant, total nitrogen, phosphorus and potassium in the first form are 2.38-2.48%; 0.78-0.83%; 2.35-2.45%, 1.95-2.05% at the end of vegetation; 0.61-0.66%; 1.43-1.55% and the highest amount was obtained in the N60 + background variant: 2.51-2.61; 0.82-0.87 and 2.45-2.53%, the amount of total nitrogen at the end of the growing season is 2.08-2.15%, total phosphorus is 0.66-0.72% , total potassium ranged from 1.58 to 1.71%. The highest levels of total nitrogen, phosphorus and potassium in all formats were observed in the N60 + background variant.

As a result of the application of mineral fertilizers under alfalfa, it was found that the correlation between the amount (%) of total nitrogen, phosphorus and potassium in the surface mass by variants, forms and years and the green mass of alfalfa (s / ha) accordingly, in 2016, in the 3rd format, p = + 0.910 ± 0.080; In 2017, p = + 0.994 ± 0.00 in the 1st format and in 2018, p = + 0.970 ± 0.030 in the 3rd format.

Our phenological observations show that mineral fertilizers have a significant effect on the height of alfalfa in terms of shape. In the fertilizer-free variant, 3 forms of alfalfa were carried out in the first year and the average height of 3 forms was 43.3 cm. In the P90K60 (background) variant, these figures are 45.8; 53.3; 49.6 cm, average height 49.6 cm, increase compared to unfertilized variant was 6.3 cm or 15.0%. As a result of the combined application of NPK, clover height has increased significantly compared to the control and P90K60 (background) options. Thus, the average height in the N30 + background variant is 54.0 cm, the increase is 10.7 cm or 25.0% compared to the control, and the highest height is observed in the N60 + background variant, the average height is 62.8 cm. relatively 19.5 cm or 45.0%. In the second and third years of the situation, the height of alfalfa in all forms was higher than in the first year, which is due to the fact that alfalfa creates a stronger root system, enriches the soil with nutrients and biological properties.

It was determined that there is a correlation between clover height (cm) and green grass yield (s / ha) according to the appropriate shapes, which also changed according to the shapes and years as follows: In 2016, in the 1st shape p = + 0,994 ± 0,005, in the 5th format in 2017 p = + 0,997 ± 0,003; In 2018, in the 3rd format, p = + 0.996 ± 0.004.

One of the factors influencing the growth of green mass is plant density. During the study, it was observed that the application of mineral fertilizers had a significant effect on the plant density per 1 m2. In the first year of alfalfa condition, the number of plants per 1 m2 at the end of the growing season was higher, and in the following years of alfalfa condition, the number of plants per 1 m2 decreased. Thus, in the first year of alfalfa in the fertilizer-free control variant,

the number of plants per 1m2 at the end of the vegetation was 180.2 units, in the background (P90K60) variant it was 215.5 units / m2, 35.3 units or 19 out of control. , Was more than 6%. 240.2 units / m2 according to N30 + background variant; 60.0 units / m2 or 33.3% more. The largest number of plants per 1 m2 was observed in the N60 + background variant and was 300.7 units / m2, which is 125.5 units / m2 or 66.8% increase compared to the fertilizer-control option. has done.

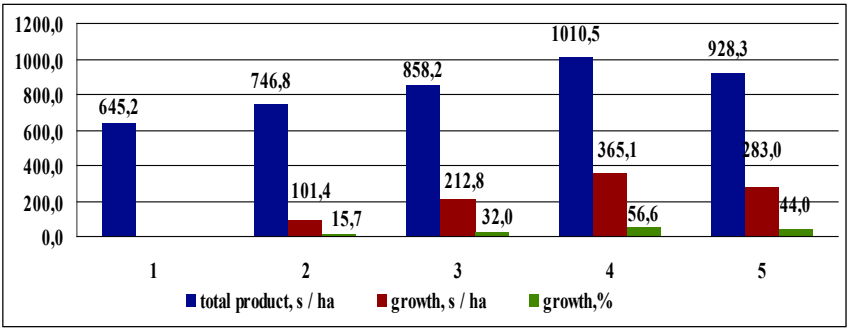
In the third year of alfalfa condition, the number of plants decreased in all variants compared to the second year. Thus, the number of plants in the non-fertilizer-controlled variant decreased by 48.1 units / m2 and was 85.4 units / m2. In the background, the number of plants decreased by 57.1 units / m2 to 98.5 units / m2, but the number of plants was 13.1 units / m2 or 16.6% more than in the non-fertilized option. The largest decrease in the number of plants was observed in the N60 + background variant, where the number of plants was higher, as in the second year, and decreased by 75.3 units / m2 to 120.5 units / m2. In the background, the norm of nitrogen fertilizer (N90) was reduced in all three cases of alfalfa compared to the background variant N60 +.

Phenological observations show that mineral fertilizers have a significant effect on the number of stems formed in a plant. This ultimately leads to increased productivity. The effect of mineral fertilizers on the number of stems per plant has been determined for an average of 3 years. Thus, the number of stems formed on one plant in the fertilizer-free control variant is 11.2, in the background variant (P90K60) 13.4, in comparison with the growth control 2.2 or 20.0%, background + N30 15.1 units in the variant, an increase of 3.9 units or 35.0%, and the highest amount is 17.7 units in the background + N60 variant; There was an increase of 6.5 units and 58.0%. In the norm of N90 together with the background, 16.2 units decreased compared to the background + N60 variant; 5.0 units increased by 45.0% compared to the control.

It was found that there is a high correlation between the number of stems (units) formed in a plant and the green alfalfa yield (s / ha) of alfalfa, and this relationship in 2016 was $p = + 0.973 \pm 0.022$; In

2017 it changed between p = + 0.983 ± 0.015 and in 2018 it changed between p = + 0.985 ± 0.010.

The effect of mineral fertilizers on alfalfa green grass yield was studied and analyzed. In the fertilizer-free variant, the green grass yield of alfalfa is 645.0 s / ha on average for 3 years. In the P90K60 (background) variant, 746.8 s / ha, the increase compared to the control was 101.4 s / ha or 15.7%. With the increasing rate of nitrogen fertilizers along with the background, productivity has increased significantly compared to the control and background options. Thus, in accordance with the N30 + background variant, these indicators are 858.2 s / ha, an increase of 212.8 s / ha or 33.0% compared to the control variant, the highest productivity in the N60 + background variant is 1010.5 s / ha. which was 361.5 s / ha or 56.6% more than the control option. 928.3 s / ha in N90 + background variant; that is, an increase of 283.0 s / ha or 44.0%. The accuracy of the experiment is P = 1.32-2.95%, the increase in variants E = 1.45-8.0 s / ha and the increase in variants E, s / ha from the indicator 3 and more times, which proved the accuracy of the experiment in the mathematical calculation of product accounting.



E=1,45-8,0 s/ha, P=1,32-2,95%

Fig.1. The effect of mineral fertilizers on the productivity of alfalfa green mass (Average s / ha from 3 years) 1. Control (without fertilizer); 2. P90K60 + (background); 3. N30 + (background); 4. N60 + (background); 5. N90 + (background)

Mineral fertilizers not only increase the yield of alfalfa green grass, but also significantly increase its quality. The effect of mineral

fertilizers on the quality of alfalfa green grass product, feed unit yield and amount of digested protein was also studied. In the first year of the clover's life, the dry matter content (in the air) in the green grass mass is 19.5-20.3% in the first form without fertilizer, and 18.5-19.5% in the last form. protein 14.25-14.56% and 12.2-11.44%, nitrate nitrogen 125.6-135.4 and 118.4-128.3 mg / kg in wet weight, the highest amount of N60 + 21.5-22.5% and 20.6-21.8%, respectively, in the background variant; 15.44-16.31 and 13.0-13.44%; 168.7-175.7 and 162.4-170.6 mg / kg were observed. The amount of nitrates in the green mass of alfalfa was less than the allowable level in fodder crops (200 mg / kg in the wet mass), which indicates that the obtained green mass is an environmentally friendly product. .

According to the triennial status of alfalfa, the feed unit yield and the amount of digested protein in the total green grass product were determined by calculation. In the control (fertilizer-free) variant, the feed unit yield is on average 14,199.0 kg / ha for three years, and the digested protein is 2452.7 kg / ha. The highest amount of feed unit output and digestible protein in N60P90K60 variant, feed unit yield 22231.7; 8032.7 kg / ha or 56.6%; digested protein was 3840.0 kg / ha, an increase of 1387.3 kg / ha or 56.6% compared to the control.

Depending on the condition of the clover, the dry root mass, the amount of NPK in the root and the amount of nutrients entering the soil vary. , 1.78-1.83% of the total NPK in dry matter in the air; 0.35-0.38% and 1.15-1.23%, nitrogen entering the soil 46.64-120.0 kg / ha, phosphorus 9.2-25.0 kg / ha and potassium 30, 3-80.6 kg / ha, and the highest amount in the N60 + background variant is 41.8-100.8 s / ha, respectively; 2,13-2,18; 0.48-0.53 and 1.44-1.61%; 89.03-219.74; 20.1-53.4 and 60.35-162.3 kg / ha. The increase in root mass affects the increase of organic-biological substances and, consequently, soil fertility.

Depending on the condition and productivity of alfalfa, the amount of nutrients taken from the soil by dry grass products varies, with the lowest amount observed in the first year of the condition and the highest in the third year of the condition. Thus, in the control

variant, the yield of dry grass is 86.64-153.8 s / ha, nitrogen from the soil 184.5-321.4 kg / ha, phosphorus 54.6-101.5 kg / ha and potassium 158, 6-283.0 kg / ha. The highest amount of nutrients extracted from the soil is 155.2-266.0 s / ha, respectively, observed in the N60 + background variant; 366.3-625.1; 118.0-207.5 and 326.0-566.6 kg / ha.

Our economic calculations show that the total net income from one hectare of clover is 1020.0-1865.3 manat, and the level of profitability is 162.7-208.0%. varies between.

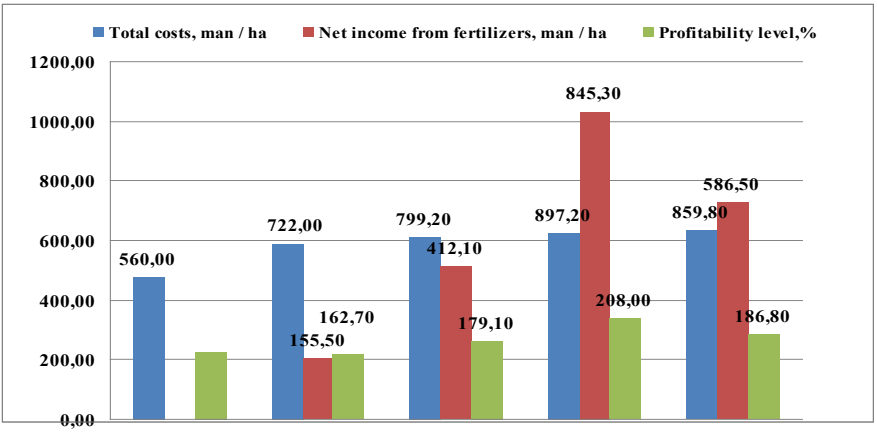


Fig.2. Effect of mineral fertilizers on the economic efficiency of alfalfa (average of 3 years) 1. Control (without fertilizer); 2. P90K60 + (background); 3. N30 + (background); 4. N60 + (background); 5. N90 + (background);

It was determined that the net income from mineral fertilizers increases between 155.5-845.3 man / ha. Compared to the control (fertilizer-free) option, the highest net income due to fertilizers was 845.3 manat / ha in the N60P90K60 option, and the level of profitability increased by 208.0%.

This suggests that optimal fertilizer rates have a positive effect on the productivity of alfalfa, as well as product quality and soil fertility. At the same time, it is considered economically viable.

RESULTS

1. The study found that the application of mineral fertilizers under alfalfa increases the potential and effective soil fertility. After three years of alfalfa, humus 0.12%, total nitrogen 0.05%, phosphorus 0.05% and potassium 0.12% were absorbed in the 0-30 cm plowing layer of the soil. Ammonia nitrogen is 8.7 mg / kg, nitrate nitrogen is 6.1 mg / kg, motor phosphorus is 14.0 mg / kg and metabolic potassium is 34.8 mg / kg, which is higher than the agrochemical indicators before sowing alfalfa.
2. Under the influence of mineral fertilizers, the amount of nutrients in the surface mass of alfalfa varies according to the form. High levels of total nitrogen, phosphorus and potassium were observed in the first form, and in subsequent forms decreased towards the end of the vegetation. According to the formations, the total nitrogen in the surface mass of alfalfa increases by 0.05-0.32%, phosphorus by 0.03-0.12% and potassium by 0.10-0.36% compared to the unfertilized variant. The highest total NPK was higher in each of the formats in variant N60P90K60.
3. Mineral fertilizers have a significant effect on the height of alfalfa in terms of shape, plant density, the number of stems per plant. Depending on the norms of mineral fertilizers, the height of alfalfa by form is 6.3-29.5 cm compared to the unfertilized variant, the number of plants is 23.5-72.7 units / m2 or 17.7-54.7%, the number of stems The number increased from 2.2 to 6.5 units or 20.0 to 58.0%. In the research years, the highest performance was observed in the variant N60P90K60.
4. In the first year of alfalfa condition 735.3 s / ha of 3 forms, in the second year 1098.3 s / ha of 5 forms, in the third year 1198.0 s / ha of green grass were obtained from 5 forms. On average, the highest green grass yield in three years was 1010.5 s / ha in N60P90K60 variant, and the growth was 365.1 s / ha or 56.6% compared to control (without fertilizer).

5. Mineral fertilizers, in addition to increasing the yield of alfalfa green grass, significantly increase the amount of dry matter, crude protein and nitrogen nitrogen in its quality indicators compared to the control option. The amount of nitrates in the green mass of alfalfa was less than the allowable level in fodder crops (200 mg / kg in wet mass). High amount of feed unit output and digestible protein in the variant N60P90K60 22231.7 kg / ha, respectively; growth compared to control 8032.7 kg / ha or 56.6%; 3840.0 kg / ha, 1387.3 kg / ha or 56.6%.
6. Mineral fertilizers have a significant effect on the root mass, chemical composition and amount of nutrients in the clover. In the third year of alfalfa condition, the root mass of clover is 10.5-35.3 s / ha compared to the control (without fertilizer) variant, nitrogen entering the soil is 23.0-99.74 kg / ha, phosphorus is 8.44-28.4 kg / ha and potassium increases between 22.0-81.7 kg / ha.
7. Mineral fertilizers also have a significant effect on the amount of nutrients in alfalfa. Depending on the productivity of fertilizers, nitrogen from clover dry grass products is 74.9-303.7 kg / ha, phosphorus 28.1-106.0 kg / ha and potassium 76.0-283.6 kg / ha. ha compared to the control (fertilizer-free) option.
8. Economic analysis of the application of mineral fertilizers under alfalfa shows that the highest net income due to fertilizers was obtained in the variant N60P90K60 845.3 man / ha, and the level of profitability increased by 208.0%.

RECOMMENDATIONS FOR ECONOMICS

1. Our field experiments and practical work on irrigated gray-brown soils show that in order to obtain high and high-quality grass products and to maintain soil fertility, alfalfa is used annually under the N60P90K60 standard. It is recommended that farms apply mineral fertilizers to their farms.

2. Sowing should be carried out in the 2nd decade of September at the rate of 15 kg of alfalfa seeds per hectare. A cross rake is drawn and irrigated to a depth of cm, and it is advisable to apply nitrogen fertilizer after the first harvest.

The main content of the dissertation is reflected in the following articles:

1. SA Khalilov. Mill - The importance of biohumus in increasing soil fertility in the Karabakh plain. Azerbaijan ETIU. II International Conference of the Council of Young Scientists of the Agrarian Science Center. Ganja. 09-11 June 2015. p. 95-99
2. SA Khalilov. Study of the effectiveness of irrigation and fertilizers under alfalfa in Ganja-Gazakh region. Azerbaijan Agrarian Science. Journal. Baku, 2019 № 1. p. 37-41
3. SA Khalilov. Importance of alfalfa in agriculture. Baku Engineering University. III International Scientific Conference of Youth. Baku, April 29-30, 2019. p. 281-284
4. SA Khalilov. The effect of mineral fertilizers on the accumulation of total nitrogen, phosphorus and potassium in the surface mass of alfalfa under irrigation. Azerbaijan Agrarian Science. Journal. Baku, 2019 № 2. p. 183-185
5. SA Khalilov. Agrochemical features of clover soils in Ganja-Gazakh region. Ganja Branch of the Azerbaijan National Academy of Sciences. News bulletin. Ganja-2019 №2. p. 139-143
6. SA Khalilov. The effect of mineral fertilizers on changes in the nutrient regime of the soil under the clover in gray-brown soils. Azerbaijan State Agrarian University is published.
7. SA Khalilov. Influence of mineral fertilizers on yield and quality of alfalfa green mass. Journal. Agrarian Science Moscow
8. E.R. Allahverdiev, SA Khalilov. Rational use of land and agro-climatic resources. Russian Science in the Modern World XXIV International Scientific-Practical Conference

Moscow August 31, 2019 st 3-5 Scientific-Publishing Center Actuality. RF COLLECTION OF ARTICLES
9. ER Allahverdiyev, SA Khalilov. Influence of application of irrigation and fertilizer norms on green mass productivity of covered barley and clover, its quality indicators. Proceedings of the Republican scientific-practical conference on the development of ecologically clean agriculture in Azerbaijan. Ganja 2019. p. 57-61
10. Influence of norm of fertilizers on root mass, chemical composition and quantity of alfalfa nutrients. Bulletin of Science and Practice. Moscow, 2019. №12. p. 219-222.
11. Influence of norm of fertilizers and water on change of nutrient regime on mixed sowings of alfalfa and alfalfa. Men's agricultural magazine. Nizhnevartovsk, 2021-2. p. 57-60
12. The effect of mineral fertilizers on the amount of nutrients entering the soil with the root residues of clover and soil fertility. Republican scientific conference on "New directions of development of agrarian farms and protection of the environment" (online) Baku, 2021. pp. 240-243
13. E.R. Allahverdiev, SA Khalilov Influence of organic and mineral fertilizers on the accumulation of total nitrogen, phosphorus and potassium in the above-ground mass of alfalfa. Bulletin of Science and Practice. Nizhnevartovsk, 2021 №7. p. 62-67.

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Address: AZ 1073, Baku, M.Rahim street 5
e-mail: tai.amea@mail.ru

The dissertation can be found in the library of the Institute of Soil Science and Agrochemistry of ANAS.

Electronic versions of the dissertation and abstract are posted on the official website defterxana@tai.science.az.

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