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INFLUENCE OF IRRIGATION AND FERTILIZER NORMS ON THE PRODUCTIVITY OF ALFALFA

ВЛИЯНИЕ НОРМ ПОЛИВА И УДОБРЕНИЙ НА ПРОДУКТИВНОСТЬ ЛЮЦЕРНЫ

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The article describes in detail the effect of irrigation and fertilizer norms on the productivity of alfalfa in poorly watered, gray-meadow soils. Effective use of covered sowing ensures that two or three harvests per year can be harvested from a single land plot. As a result, grain, especially forage production, is growing more intensively with land and other means of consumption. This, along with increased productivity, has a positive impact on soil fertility and its phytosanitary status. It was revealed that the alfalfa plant's productivity, quality, chemical composition depends on the fertility of the soil, its moisture content, the degree of macro and microbial support, the climatic conditions of the area, and other factors. For each variant and repetition, the cutting was carried out in the budding phase of the alfalfa plant and the productivity was calculated. Increase in crop yields was observed as a result of applying irrigation and fertilizer norms. In the end, the mathematical calculation of product records proved the accuracy of the experiment. The increase in crop yields by irrigation and fertilizer was several times higher than that shown in the optimal variant. The increase in crop yields by irrigation and fertilizer was several times higher than that shown in the optimal variant.

During the planting of alfalfa plants, it was found that in the vegetation period, in the $N_{45}P_{120}K_{90}$ variant, along with productivity, the quality indicators of the product increased by 5 times.

The maximum yield on the 5-time irrigated crop using the $N_{45}P_{120}K_{90}$ variant was an average productivity of 723 h / ha, an increase of 271 h / ha or 59.95 % compared to the fertilizer-control variant.

Key words: *soil, alfalfa plants, irrigation norms, fertilizer, productivity.*

В статье подробно описано влияние поливных норм и норм удобрений на урожайность люцерны на малообводненных серо-луговых почвах. Эффективное использование закрытого посева обеспечивает получение двух-трех урожаев в год с одного земельного участка. В результате производство зерна, особенно на корм скота, интенсивнее растет с использованием земли и других средств потребления. Это, наряду с повышением продуктивности, положительно сказывается на плодородии почвы и ее фитосанитарном состоянии. Выявлено, что продуктивность, качество, химический состав растений люцерны зависят от плодородия почвы, ее влажности, степени макро- и микробного обеспечения, климатических условий местности и других факторов. В каждом варианте и повторении обрезку проводили в фазе бутонизации растения люцерны, и рассчитывали продуктивность. Повышение урожайности отмечено в результате применения норм орошения и удобрений. В конце концов, математический расчет товарных записей подтвердил точность эксперимента. Прибавка урожая от орошения и удобрения в несколько раз превышала показатель, показанный в оптимальном варианте. При посеве люцерны установлено, что за вегетационный период в варианте $N_{45}P_{120}K_{90}$ вместе с урожайностью увеличились показатели качества продукта в 5 раз.

Максимальная урожайность при 5-кратном поливе и использовании варианта $N_{45}P_{120}K_{90}$ составила в среднем 723 ц/га, прибавка составила 271 ц/га или 59,95 % по сравнению с вариантом контроля с удобрениями.

Ключевые слова: *почва, растения люцерны, нормы полива, удобрения, продуктивность.*

Introduction

One of the most important of the complex measures for agricultural development in the country at present is the expansion of covered crops and increase of their productivity. Effective use of covered sowing ensures that two or three harvests per year can be harvested from a single land plot. As a result, grain, especially forage production, is growing more intensively with land and other means of consumption.

According to Academic M. I. Jafarov, professors RM Guliyev, NA Safarov, the productivity of each crop depends on how much of the plant uses external environmental factors. The main indication of the variety is that productivity depends on the factors that affect it, suggesting that agricultural crops can increase their productivity by more efficient use of life factors [1].

Long-term studies show that after harvesting cereal crops, the field remains empty for 110–125 days until new grain crops are sown. At this time the soil is exposed to varying degrees of degradation. So, because of the direct fall of solar energy on the non-planted area, evaporation from the land surface is intensified. As a result, the soil's water-physical properties deteriorate. When the plowing is done, it causes big chunks of the land to form.

In rainy years, the moisture is created and the seeds of weeds in the soil grow and develop due to favorable temperatures and other factors of life. Even sometimes, the weeds that have been completed their lige cycle in some years, develop their seeds around and cover the soil with weeds. The phytosanitary condition of the soil is worsening, which has a direct impact on the soil's nutrients and their fertility.

Selection and application of cultivation methods for specific agroecological conditions eliminates a number of soil-related problems, while inadequate cultivation can lead to disturbance of soil structure, accelerated erosion, reduction of organic matter and fertility, degradation of carbon and water cycles, as well as disruption of the metabolic processes. [8]

Results and Discussions

Lack of protein in animal feed also results in reduced productivity and inefficient use of feed. The dry matter of alfalfa contains about 22 % protein. In addition, alfalfa contains carotene, vitamin B, ascorbic acid, basic macro and micronutrients, and so on. All this shows that perennial legumes, especially alfalfa, play an important role as one of the main feed sources in solving the problem of establishing a solid feed base [2].

Many vitamins and minerals of alfalfa have a positive effect on metabolism and health, and beta-carotene in large quantities. Alfalfa is not only fodder for animals but also therapeutic. It is important as a cough medicine, as a painkiller. It is known that the lack of protein in the feed portion reduces both productivity and also leads to inefficient use of feeds. Alfalfa contains about 22 % protein in dry matter [5].

The number of digestive proteins in the green mass of alfalfa and other nutrients is greater than that of other legumes. Alfalfa is also rich in vitamins for animals. At the same time, alfalfa improves the structure of the soil along with its nitrogen enrichment and is therefore considered to be a good predecessor for other agricultural plants [4].

Plants absorb and develop the necessary nutrients from the soil during the growing season, and during this period, structural and functional changes occur in the soil. Soil cultivation has a significant impact on its agrophysical properties and crop productivity. The biological productivity of natural and agroecosystems depends on the soil moisture, the method and depth of cultivation, the degree of physical humidity in the cultivation and the climatic conditions. A number of studies on soil cultivation show that the agrophysical properties and their variability are controversial [6, 7].

In order to make the most of the use of soil and agro-climate resources, we have planted a mixture of barley and alfalfa in autumn, in poorly fed gray-meadow soils in the lower part of Karabakh region. It is important not only for the maintenance of soil fertility but also for increasing feed production. Immediately after the barley was harvested in early June, the straw was removed and fertilizers were applied and irrigated. Long-term studies show that without the nitrogen fertilizer, the use of phosphorus and potassium does not significantly increase alfalfa crop productivity.

Research shows that the correct selection of plants in mixed sows, the proper implementation of complex agro-technical measures has a positive effect on overall productivity growth [3].

Productivity, quality indicators, chemical composition of alfalfa depends on the fertility of the soil, its moisture content, the degree of macro and microbes, the climatic conditions of the area and other factors. In this regard, it is important to optimize the life factors.

The study revealed that the applied watering and fertilizer norms had a major impact on the green mass of the alfalfa plant under the barley and greatly increased its productivity. The cutting were made in the budding phase of the alfalfa plant. As can be seen from the table, 4 times irradiation (3800 m3 / ha) for green mass formations (fertilizer I, II, III, IV) with no fertilizer-controlled option is 104; 105; 110; when the fertilizer standards $N_{30}P_{90}K_{60}$ are applied at 100 s / ha, the cutting values are 135; 145; 148; 134 h / ha, green mass product 160 when $N_{45}P_{120}K_{90}$ is applied; 168; 173; 156 c / h, 120 fertilizers when fertilized with organic fertilizer 10 t / ha; 124; 127; 119 h / ha, manure 10 t / ha + $N_{15}P_{60}K_{30}$ 152 in given version; 156; 158; Up to 149 h / h.

112 for green mass formulations (fertilizer I, II, III, IV) in the fertilizer-controlled variant against 5-time irrigation (4800 m3 / ha) 112; 116; 119; At 105 s / ha, productivity increased considerably when fertilizers at different rates are used. Thus, when the $N_{30}P_{90}K_{60}$ fertilizer standards were applied, the shape values were 158; 165; 168; 158 h / h, green mass product $N_{45}P_{120}K_{90}$ when applied 178; 183; 187; 175 c / h, organic fertilizer manure 10 t / ha + P35 142; 151; 154; 138 h / ha, manure 10 t / ha + $N_{15}P_{60}K_{30}$ 156 in given version; 163; 167; Up to 151 h / h. As can be seen from the table, the average yield for the 4 years of irrigated land was $N_{45}P_{120}K_{90}$, with an average productivity of 657 h / ha. This is an increase of 238 h / ha or 56.80% compared to the fertilizer-control variant. Higher fertilizer rates could increase productivity as much as the accuracy of practice.

The maximum yield on the 5-time irrigated crop using the $N_{45}P_{120}K_{90}$ variant was an average productivity of 723 h / ha, an increase of 271 h / ha or 59.95% compared to the fertilizer-control variant. Higher fertilizer rates could increase productivity as much as the accuracy of practice.

In the end, the mathematical calculation of product records proved the accuracy of the experiment. The increase in crop yields by irrigation and fertilizer was several times higher than that shown in the optimal variant.

Table. **Influence of irrigation and fertilizer norms on green mass productivity of mixed sown alfalfa (2018)**

s/s	Variants	Productivity f/ha				Average productivity f/ha	Increase	
		I cut	II cut	III cut	IV cut		F/ha	%
		4 times irrigation 3800 m^3/ha						
I	Control without fertilizer	104	105	110	100	419	–	–
II	$N_{30}P_{90}K_{60}$	135	145	148	134	562	143	34,12
III	$N_{45}P_{120}K_{90}$	160	168	173	156	657	238	56,80
IV	Manure 10 t/ha	120	124	127	119	490	71	16,94
V	Manure 10 t/ha+$N_{15}P_{60}K_{30}$	152	156	158	149	615	196	46,77
		5 times irrigation 4800 m^3/ha						
I	Control without fertilizer	112	116	119	105	452	–	–
II	$N_{30}P_{90}K_{60}$	158	165	168	158	650	198	43,87
III	$N_{45}P_{120}K_{90}$	178	183	187	175	723	271	59,95
IV	Manure 10 t/ha	142	151	154	138	585	133	29,42
V	Manure 10 t/ha+$N_{15}P_{60}K_{30}$	156	163	167	151	637	185	40,92

At the end of the study, it was concluded that during the vegetation period, throughout the growing season and alfalfa crops, the crop performance increased along with the yield of the variant $N_{45}P_{120}K_{90}$.

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