

The Value Of The Use Of Slow-Acting Fertilizers In Reducing Environmental Pollution

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ABSTRACT

When making CFF nitrogen consumption of soil resources in the year of its operation increases in the second year (aftereffects) decreases unproductive nitrogen losses from CFF markedly lower than urea. CFF raises productivity *Artemisia leucodes* Schrenk. In field experiments, conducted in the irrigated typical gray soils and debris, the harvest was bigger by 10-30% compared to the control. The research results point to a definite advantage of using a slow acting carbamide-formaldehyde fertilizers (CFF) than urea and ammonium nitrate in reducing environmental pollution harmful to the body remains of the fat. It was found that the use of slow acting. Urea-formaldehyde fertilizer is particularly important in conditions of saline soils with shallow groundwater where significant nitrogen losses occur as a result of leaching of nitrates into the groundwater.

It was revealed that a higher content of nitrates in the soil when making nitrogen fertilizer as ammonium nitrate and urea lead to a significant loss of battery sizes that reach considerable values. As a result, there are a number of issues surrounding pollution as the most dangerous are increasingly finding the nitrates in the soil. It should be noted that not only accumulate nitrate in the soil - soil, ground water, but higher than allowable standards accumulate in food and feed, thus enters the body of animals and humans

Keywords: slow-release fertilizer, carbamideformaldehyde fertilizers (CFI), *Artemisia leucodes* Schrenk - wormwood whitish, denitrification, ureaformaldehyde fertilizer (IFIs), Standard tuki, yield, budization.

1. INTRODUCTION

Numerous researchers have recognized that the leading factor in increasing the productivity of the cotton plant is the use of nitrogen fertilizers.

It is known that among mineral fertilizers, nitrogen fertilizers have the most significant impact on the productivity of agricultural and medicinal plants.

Recent studies show that the intensive use of mineral fertilizers and chemical plant protection products for agricultural and medicinal crops, as well as various tillage systems, has activated microbiological processes and accelerated the cycle of nutrients. Under these conditions, the productivity of plants initially increased, while reducing humus substances in the soil due to a reduction for humification of plant residues and organic fertilizers. This led to a decrease in the protective function of humus substances as an adsorbent of toxic compounds and elements of mineral nutrition entering the soil, which was a limiting factor in increasing the yield of both agricultural and medicinal crops and reducing the effectiveness of mineral fertilizers, especially nitrogen [1, 4, 6, and 14].

The intensification of biological processes led not only to the destruction of soil organic matter, but also to the rapid transformation of amide and ammonia forms of nitrogen fertilizers into nitrates, followed by their leaching into groundwater and rivers, the development of denitrification, which contributed to an increase in gaseous unproductive losses of nitrogen from soil and fertilizers and their pollution of the natural environment [7, 8, 9, 12]. All this contributed to a decrease in the efficiency of nitrogen fertilizers on agricultural and medicinal plants and a decrease in their effectiveness.

Numerous researchers have found that in the conditions of a typical serozem, cotton uses nitrogen fertilizers not by 70-80%, as previously thought, but by 40-42 [13, 15]. At the same time, as they consider, gaseous and other types of losses arising as a result. denitrification or leaching of nitrates are the main reasons for the incomplete use of nitrogen fertilizers by plants.

With the use of the nitrogen isotope ¹⁵N in studies, it was found that in conditions of meadow soils with a close occurrence of ground water (1.2-1.5 m), nitrates can be washed out irrevocably, polluting water sources with them, which creates the most serious consequences for a living organism. The total nitrogen loss during one year, (from autumn to autumn of the

following year) is 53 kilograms per hectare. As part of the total losses, more of the nitrogen is soil nitrogen than fertilizer nitrogen. The main nitrogen losses of fertilizers occur because of leaching of nitrates in the autumn-winter periods, than during the growing season of cotton.

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The intensification of biological processes led not only to the destruction of soil organic matter, but also to the rapid transformation of amide and ammonia forms of nitrogen fertilizers into nitrates, followed by their leaching into groundwater and rivers, the development of denitrification, which contributed to an increase in gaseous unproductive losses of nitrogen from soil and fertilizers and their pollution of the natural environment [7, 8, 9 and 12]. All this contributed to a decrease in the efficiency of nitrogen fertilizers on agricultural and medicinal plants and a decrease in their effectiveness.

Currently used for medicinal, technical, vegetable, fruit and other agricultural plants on a large scale, nitrogen fertilizers (urea, ammonium nitrate) have a number of disadvantages. For example, both ammonium and ammonia fertilizers after some time (within 5-7 days) after application to the soil, they turn into nitrate forms.

The use of high rates of nitrogen fertilizers that exceed the need of plants for the formation of planned crops is accompanied by a significant accumulation of nitrogenous substances in the soil, water sources, and food. In addition, as a result of denitrification and a number of other chemical reactions, there are huge losses of nitrogen in the environment of its incomplete oxides, which penetrate into the atmosphere and pollute the environment.

The effectiveness of nitrogen fertilizers largely depends on the behavior of their transformation in the soil and on the availability of plants. It is known that ammonium nitrate and urea, as the main forms of nitrogen fertilizers, are characterized by high mobility in the soil. The ammonia and amide nitrogen of these fertilizers, due to the high biogenicity of the soils of Central Asia, quickly pass into the nitrate form. The high mobility of nitrates in the soil leads to the fact that in the summer, under the influence of irrigation water, they are washed out into the deep layers of the soil, and after irrigation, ascending currents of moisture rise to the surface of the soil and concentrate on the ridges of rows in the horizon of 0-5 cm, which reduces the effectiveness of nitrogen fertilizers.

In addition, most of the fertilizer nitrogen introduced is lost irretrievably, either in gaseous form, or is washed out and not used by plants.

Losses of nitrogen from the soil and applied fertilizers can occur because of leaching by precipitation, irrigation water most of all in the forms of nitrates and nitrites.

Using the ^{15}N isotope, it was found that the true nitrogen coefficients of standard tuks (urea, ammonium nitrate) are very low and do not exceed 35-40%.

The reason for the low use of nitrogen fertilizers is its gaseous loss from the soil because of the denitrification of nitrates, at the same time in these conditions there is a leaching of nitrates into the ground water, which also leads to an unproductive loss of nitrogen from the soil. According to some researchers [5], leached nitrates were found in groundwater at a depth of 10 m.

Researchers [7] believe that the systematic and massive use of nitrogen fertilizers for agricultural crops can cause a violation in the biochemical cycle of nutrients in the natural environment. Such violations are primarily common in regions of intensive agricultural production - in cotton-growing, beet-growing, vegetable-growing and other areas of agriculture. It should be noted that scientists on dark gray soils in the conditions of bogara in the soil layer of 3-12 m found about 480 kg per hectare of nitrates [3].

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In this regard, further increasing the yield of agricultural crops, including cotton and medicinal plants, requires increasing the doses of nitrogen fertilizers. According to experts, about 50% of the increase in yield is obtained through the use of nitrogen fertilizers. However, with an increase in the rates of nitrogen fertilizers applied, their efficiency progressively decreases, and the increasing amount of nitrogen used poses a potential threat to the environment, turning into a factor of

pollution of the hydrosphere and troposphere.

Summarizing the above materials, it should be noted that the use of high rates of nitrogen fertilizers, exceeding the need of plants for the formation of planned crops, is accompanied by a significant accumulation of nitrogenous substances in the soil, water sources, and feed products. In addition, as a result of denitrification and a number of other chemical reactions, there are huge losses of nitrogen in the form of its incomplete oxides, which, penetrating into the atmosphere, pollute the environment with all the negative consequences that follow from this.

Researchers [10] note that one of the main directions of agrochemical and physiological science is the search for new forms of fertilizers, from which nitrogen would be released gradually, well absorbed by the roots and would not pollute the environment. In addition, these fertilizers should have a reclamation effect, helping plants to get moisture from the soil by reducing the osmotic pressure of the ionic solution and reducing the toxic effect of toxic soil salts.

Such fertilizers can be nitrogen-phosphorus complex polymer fertilizers (SPU), urea-formaldehyde fertilizers (MFP) and others that contribute to improving the agrochemical indicators of saline and unpopulated soils. The peculiarity of this fertilizer is that it has a prolonging property, i.e. it helps to provide plants with nutrients evenly throughout the growing season, which increases the use of nitrogen fertilizers by plants and the service life.

Currently, one of the most pressing environmental issues is to prevent the transition of amine nitrogen to nitrates, i.e., the nitrification process, since the latter pollutes the soil with nitrates, reducing efficiency.

To obtain high yields of improved quality, as well as to reduce the level of environmental pollution, it is necessary to develop methods for the effective use of nitrogen fertilizers in the cultivation of various agricultural and medicinal plants.

In this regard, the development of scientific bases for increasing the useful effect of nitrogen on agricultural and medicinal crops, reducing environmental pollution with harmful residues of beetles, is of scientific and practical importance.

Forms of mineral fertilizers, especially nitrogen fertilizers, are of particular importance for solving the environmental problems of intensive agriculture. The most promising in this regard should be considered slow-acting fertilizers, the rate of dissolution of which is much lower than simple ones.

Researchers [2] proved that the use of a slow-acting urea-formaldehyde fertilizer on sandy loam soil provided the highest yield of raw cotton on a medium-saline background - it was 5.2% higher than the variant with urea. It is also established that to bring the effectiveness of urea formaldehyde fertilizer (CFU) to the level of standard tuks and even exceeding it, it is advisable to apply fractional CFU with two urea fertilizations carried out during budding periods at the beginning of flowering; at the same time, the use of CFU is most effective on saline sandy loam soils.

Slow-acting fertilizers (CFCs) have a prolonging property, due to their reduced solubility in water, they supply the plant with nutrients evenly, throughout the entire growing cycle. When applying urea, the level of nitrates in the soil is higher than when using CFCs. This reduces the leaching of nitrates and nitrites into the ground stream. In the latter case, the urea nitrogen utilization rate was 43.5%, while for CFCs it was 33.2%, i.e. 10.3% less. The amount of nitrogen fixed in the soil during the introduction of CFCs was almost twice as high.

Application of slow-acting nitrogen fertilizers (CFCs) in relation to standard tuk (urea) reduces gas losses, as well as losses resulting from the leaching of nitrates into ground water, which is important in conditions of gravelly gray soils and typical gray soils in reducing the pollution of water sources with nitrates.

Consequently, slow-acting urea-formaldehyde nitrogen fertilizers increase the efficiency of nitrogen on white wormwood and other crops, and reduce unproductive nitrogen losses from the soil, especially on gravelly serozem and typical serozem.

So, for example, if standard tuks exhaust themselves mainly within a year, then these fertilizers can be used by the plant within two or three years, since they are more difficult to wash out of the soil and less pollute the environment.

In this regard, the use of slow-acting fertilizers to increase the productivity of agricultural and medicinal crops, as well as to reduce pollution of the environment and water sources with harmful residues of tuks is one of the main issues of agrochemical science.

Under the conditions of long-term vegetation and field experiments, it was found that the effectiveness of urea-formaldehyde and urea-formaldehyde fertilizers on cotton and some medicinal plants depends not only on the production technology (the amount of water-soluble nitrogen, the solubility index, the size of granules), but also on purely agricultural techniques: methods of embedding fertilizers in the soil, timing, methods of application and combination of slow and easily soluble forms of fertilizers [11,16,17].

Currently, urea-formaldehyde fertilizer (CFU) is produced at the Vakhsh Electrochemical Plant of the Republic of Tajikistan in the amount of 70-80 thousand tons per year, with a prolonged action with a nitrogen content of 39-40%, and water-soluble nitrogen-40-60%. The product is white or light yellow in color, obtained by polycondensation of urea (urea) with formaldehyde. The size of the particles (granules) is 2.0-2.5 mm, the fertilizer is small-hygroscopic, transported in plastic

bags.

The aim of our research was to study the influence of CFU on the growth, fruiting and yield of the *Artemisia leucodes* Schrenk plant and its quality in the conditions of irrigated typical unpopulated soils of the Tashkent and gravelly serozems of the Jizzakh viloyats.

In this regard, we set out to study the use of *Artemisia leucodes* Schrenk urea nitrogen and urea-formaldehyde fertilizers (CFCs), its conversion in the soil and their significance in reducing environmental pollution.

2. MATERIALS AND METHODS

The experiments were conducted at the agricultural experimental station of the Tashkent State Agrarian University and in the Farish district of the Jizzakh region.

The repetition of all the above types of experiments is a four-fold plot area of 600 m² on gravelly serozem and 400 m² on typical unsalted serozem. Layout of *Artemisia leucodes* Schrenk 60x25x1.

The content of humus, gross nitrogen, phosphorus and potassium in the arable horizon of a typical serozem was 1.0, 0.08, 0.13 and 2.5%), and nitrates, mobile phosphorus and exchangeable potassium were 23.0, 32.0 and 208 ml per kg of soil, respectively. Ratio C:N = 8,2:1.

To study the effect of nitrogen fertilizers on the crop and the environment, experiments were carried out on vegetation vessels and field conditions using typical and gravelly serozem. Vegetation vessels were filled with irrigated typical serozem and gravelly irrigated serozem. The depth of the ground water on the gravelly serozem was maintained at the level of 1-1.2 m, the soil moisture during the growing season of wormwood whitish within 70% of the PPV. The drainage was sand, broken glass, and pebbles.

Fertilizers were applied N 5; P 4, K 2.5 g per vessel. The experiments consisted of two variants: in the first-urea was introduced, in the second-slow-acting nitrogen fertilizers.

The experiments consisted of two variants: in one variant, urea was introduced into the soil, and in the second, urea-formaldehyde fertilizer (CFU).

The influence of CFU on the growth, fruiting and yield of white wormwood was studied in the conditions of vegetation and field experiments. For these purposes, urea-formaldehyde fertilizers were tested at a ratio of urea to formaldehyde of 1.6:1 and 2.5:1. The nitrogen content in CFCs is 40-42%.

3. RESULTS AND DISCUSSIONS

The results of the studies showed that under typical serozem conditions, when applying various forms of nitrogen fertilizers, the amount of nitrogen used by *Artemisia leucodes* Schrenk was 28-41 % (in % relative to the amount applied to the soil). When using urea, the value of this indicator was 40.5 %, and when using CFCs-28-31 %. In the second year of experiments, the amount of urea nitrogen used by the plant was 9 %, and when using CFCs or CFCs with urea - 20-22 %. For two years, the plant's use of urea nitrogen was 49 %, and the use of CFCs and CFCs together with urea was 48.0 - 53.3 %. Therefore, the amount of nitrogen use, both urea and CFCs, by the plant was almost the same. It should be noted that when applying CFCs, the content of residual nitrogen in the soil was 2 times higher than when applying urea. In the second year of the experiments, the amount of CFU nitrogen used was greater than when applying urea.

In general, the nitrogen losses during the introduction of CFCs into the soil were less than when using urea.

The height of the main stem of wormwood whitish, according to vegetation experiments, in the budding phase (15-VI) with the introduction of urea increases at an increased rate compared to CFU (Table 1). The same pattern is observed in the period of mass flowering and fruit formation of wormwood whitish (15-VI).

Table #1 he influence of various forms of nitrogen fertilizers on the growth, development and productivity of *Artemisia leucodes* Schrenk. Vegetation experience. see

Variety	Main stem growth			Number of flowers 10. IX 2010	Number of mature seeds, pcs.	Dry biomass of the aboveground part, g / vessel
	15. VI 2010 y	15. VIII 2010 y	10.IX 2010 y			
PK	5,7	22,4	23,2	2546	964	15,95
CO (NH ₂) ₂	8,9	32,6	58,7	3078	1037	20,86
KPU (2,5:1)	8,2	30,9	57,6	3018	1021	20,14
KPU (1,6:1)	8,1	30,8	57,4	3005	1006	19,68
HCP 05				6,8	7,3	1,4

Fertilizer doses: N₅P₄K_{2,5}

During the maturation period, however, in 50% of plants, the height of the main stem of wormwood whitish, grown with urea, is aligned with the height of the main stem grown with CFU. Of interest are the data on the height of the main stem), obtained in 2010 (in the aftereffect). As can be seen from Table 2, in the budding phase, there are no significant differences in the height of the main stem when applying different forms of nitrogen fertilizers. In the phase of mass flowering and the beginning of fruit formation, the growth of the main stem of wormwood whitish when applying CFU was characterized by higher indicators compared to urea (Table 2).

Table 2 The influence of different forms of nitrogen fertilizers on the growth, development and productivity of *Artemisia leucodes* Schrenk.

Variety	In the year of validity					Aftereffect				
	stem height, sm			number of flowers, pcs.	Number of mature seeds, pcs.	stem height, sm			Number of flowers, pcs.	Number of mature seeds, pcs.
	20.VI 2009 y	20.VII 2009 y	10.IX 2009 y			10. VI 2010 y	20.VII 2010 y	15.IX 2010 y		
RK	6,8	23,2	26,5	258,4	976	5,9	24,1	25,2	256,5	969
CO (NH ₂) ₂	8,7	38,7	40,7	308,5	1076	9,4	39,3	40,2	308,9	1089
CFU (2,5:1)	10,2	37,4	38,6	302,6	1053	9,2	39,6	40,8	307,3	1062
CFU (1,6:1)	9,1	36,6	37,7	301,7	1046	9,1	39,2	39,6	307,0	1052
HCP 05										1,65

As well as the height of the main stem, the number of fully formed flowers in the whitish wormwood in the first year of the experiment (in the year of action) is higher in the variant with urea than with CFU. In the second year, the pattern persists. The productivity of polyana whitish when applying CFCs (in the year of action) with a ratio of M:F=2.5:1; higher than when applying urea and slightly lower when using CFCs with a ratio of M:F=1.6:1. However, in the second year, the productivity is higher in the version with the introduction of CFCs (2.5:1) than urea and CFCs (1.6:1). The yield value in the CFU variant is at the control level (urea). For two years, the yield of wormwood whitish with the introduction of CFU in the ratio to formaldehyde 2.5:1 is higher than with the introduction of urea. In CFU, with a urea-to-formaldehyde ratio of 1.6:1, the yield was at the control level.

As a result of vegetation experiments, it was found that during the budding period of the wormwood is whitish (15.VI) the height of the main stem when applying urea and urea fertilizers did not differ significantly (Table 3).

Influence of different forms of nitrogen fertilizers on the growth, development and productivity of *Artemisia leucodes* Schrenk, field experiments

variant	In the year of validity					Aftereffect				
	stem height, sm			number of flowers, pcs.	Number of mature seeds, pcs.	stem height, sm			number of flowers, pcs.	Number of mature seeds, pcs.
	20.VI 2009 y	20. VII 2009 y	10.IX 2009y			10.VI 2010 y	20.VII 2010 y	15.IX 2010 y		
RK	5,9	22,4	25,8	2523	969	5,7	23,5	24,6	2547	958
CO (NH ₂) ₂	8,4	36,8	40,8	3076	1063	9,0	38,8	39,7	3075	1076
CFU (2,5:1)	9,9	35,7	38,9	3012	1054	8,8	39,1	40,4	3066	1058
CFU (1,6:1) +urea	9,1	35,5	38,3	3003	1043	8,7	38,9	39,2	3062	1051
HCP 05									3,1	2,7

The same data were obtained during the period of mass flowering and fruiting of the whitish wormwood. During the period of mass maturation of seeds (50%), there was a tendency to increase the growth of the main stem of wormwood whitish in variants with the introduction of CFU compared to urea. In the second year of the experiment (aftereffect), as can be seen from the table presented, growth processes occur more intensively in the variants with CFU, compared with urea, especially with a urea-to-formaldehyde ratio of 2.5:1. The number of fully formed flowers in the first year of the experiment is slightly higher in the version with urea than with CFU. In the second year (aftereffect), the reverse pattern is observed, i.e., there is an increase in the number of flowers in the variants with CFU. The yield value corresponds to the obtained data on the height of the main stem and the accumulation of fruit elements. In the year of action of fertilizers, a higher yield is obtained by using urea than CFCs.

In the second year (aftereffect) yield (biomass) higher when applying CFCs; especially CFCs in the ratio of urea to formaldehyde 2.5:1. Over two years, the yield level is higher in the CFU variant, especially when combined with urea, than in the variant with urea alone.

The studies conducted to identify the influence of different forms of nitrogen fertilizers on the growth, development and productivity of plants in vegetation and field experiments showed that in the initial periods of development of wormwood whitish in the variants with CFU, there was a lag in the height of the main stem, however, by the beginning of maturation of wormwood whitish, there was already an increase in the height of the main stem in these variants. The productivity of plants for two years of CFU application in the vegetation experiment, especially when the ratio of urea to formaldehyde is 2.5:1, is higher or was at the level with urea and CFU (1.6:1). Crop increase (biomass) from the introduction of CFU, more was obtained in the second year than in the first, which indicates a significant aftereffect of CFU nitrogen compared to urea. In the vegetation experiment, in the year of action, the lower yield of plants in the variants with CFU was established, in the year of aftereffect it increased.

According to field experiments, the height of the main stem, the number of flowers of plants is greater in the variant with CFU than urea. (Table 4) The yield of whitish wormwood when used as a CFU plant in the 2009 experiment increased by 30%, and in the 2010 experiment - by 18 % in relation to the introduction of urea. On average, for two years, the yield of whitish wormwood with the introduction of CFU was 25% higher compared to the introduction of whitish urea under the wormwood.

Table 4 Influence of different forms of nitrogen fertilizers on the height of the main stem, fruiting and productivity of *Artemisia leucodes* Schrenk, field experiments

Fertilizer forms and the ratio of urea nitrogen to formaldehyde	Main stem height, sm		Number of mature seeds per 1 plant, pcs.	Dry biomass g / vessel
	20.VII	10.IX		
2009 y.				
Urea	38,7	40,7	1076	21,25
CFU (1,6:1)	36,6	37,7	1046	19,89
2010 y.				
Urea	39,3	40,2	1089	22,15
CFU (1,6:1)	392	39,6	1070	20,05
HCP 05				

Studies have found that under typical serozem conditions, when using urea and CFU separately, the use of wormwood whitish nitrogen was close to each other. When using CFCs together with urea (70% in the form of CFCs before sowing and in flowering, and 30% in the form of urea in the budding phase), the use of nitrogen fertilizers of Polyana whitish is greater than when they are applied to the soil separately.

Due to low leaching into ground water and low gas losses, the use of CFCs on gravelly serozem, compared to typical serozem, is a more effective fertilizer than urea.

Thus, it should be noted that the use of slow-acting nitrogen fertilizers (CFCs and others) contributes to the reduction of environmental pollution (water sources, soil, atmosphere) and the production of environmentally friendly plant raw materials of the studied plant.

These slow-acting fertilizers are able to inhibit nitrification processes, which can reduce the rate of nitrogen fertilizers used (when cultivating this plant, 30-40 kg/ha), reduce pollution of both the environment and medicinal plant raw materials.

Under the conditions of long-term vegetation and field experiments, it was found that the effectiveness of urea-formaldehyde fertilizers on the studied plant depends not only on the production technology (the amount of water-soluble nitrogen, the solubility index, the size of the granules), but also on purely agricultural techniques: the method of embedding fertilizers in the soil, the timing, the method of application and the combination of slowly and easily soluble forms of nitrogen fertilizers.

It should be noted that scientists on dark gray soils in the conditions of bogara in the soil layer of 3-12 m were found about 480 kg per hectare of nitrates (Zhukova O. K., Kalinina N. I., 1975).

We and other researchers have proved that the use of slow-acting urea-formaldehyde fertilizers ensure the highest yield of whitish wormwood on crushed stone. serozeme was 5.2% higher than the urea variant. It is also established that to bring the effectiveness of urea-formaldehyde fertilizer (CFU) to the level of standard tuks and even exceeding it, it is advisable to apply fractional CFU with two urea top dressing carried out in the budding periods and the beginning of flowering; at the same time, the use of CFU is most effective on gravelly gray-earth soils.

In the experiments, the influence of CFU on the growth, fruiting and yield of white wormwood was studied in the conditions of vegetation and field experiments. For these purposes, urea-formaldehyde fertilizers were tested at a ratio of urea to formaldehyde of 1.6:1 and 2.5:1. The

results of our studies found that CFU increases plant productivity. For example, in field experiments conducted on irrigated typical serozem and gravelly serozem, the yield was 10-30% higher, respectively.

There is a tendency for slow-acting CFU nitrogen fertilizers to be more effective on saline light than on non-saline typical serozem. All this points to the prospects of using slow-acting nitrogen fertilizers on this plant.

Studies conducted by us have established that the content of nitrates and ammonia nitrogen in the soil depends on the form of nitrogen fertilizers used.

In all phases of development, the content of ammonia nitrogen in the soil is greater, and nitrate nitrogen is less when applying urea-formaldehyde fertilizer in relation to urea.

Quantitative indicators of the content of ammonia and nitrate nitrogen depend on the phase of development-. Higher values of these nitrogen compounds are associated with the phases of budding and flowering, and then they decrease, reaching a minimum in the phase of maturation of the seeds of the studied plant.

During the maturation period of plant seeds, the amount of residual nitrogen significantly prevails when urea is applied to plants than CFCs. The results of the studies indicate that the nitrification of ammonia nitrogen of CFCs is significantly less than that of urea nitrogen. As a result, the leaching of nitrates, especially in saline soils with a close occurrence of groundwater, occurs to a greater extent with the introduction of urea than CFCs. Due to the higher content of ammonia nitrogen in the soil when CFCs are applied, the residual nitrogen (unused by the plant) is reduced in relation to urea, which ultimately increases the efficiency of nitrogen on plants and reduces losses.

The total amount of residual inorganic nitrogen, consisting of nitrates and ammonia, is significantly higher when using urea for the studied plant than CFCs.

Based on these data, it can be assumed that the loss of nitrogen from urea as a result of denitrification and leaching occurs to a greater extent when urea is used for the studied plant than CFCs. This indicates a certain advantage of the use of CFCs than urea in reducing environmental pollution with harmful residues of tuks.

Similar data on the content of ammonia and nitrate nitrogen in the soil were obtained in the conditions of field experiments laid on a typical unsalted serozem.

As the above data show, the content of ammonia and nitrate nitrogen is higher during the period of reproductive development (budding-flowering-fruitletting of white wormwood), and then it decreases, which is explained by the increased consumption of nitrogen by the plant on the one hand, and on the other by its unproductive losses in the specified phases of the development of this development.

These data are confirmed by the results of soil analysis of vegetation vessels for the content of nitrates (Table 5).

Table 5 The content of nitrates in the soil, mg/l Vegetation experiments

Forms of fertilizers	Annual rate g / vessel			Phases of development		
	N	P	K	Budding	Flowering	Fruiting
Urea	6	5	2	9,4	12,6	16,2
CFU (1,6:1)	6	5	2	5,4	9,4	11,8

It should be noted that the content of nitrates in the soil at all times of their determination is significantly reduced with the introduction of CFCs than urea.

Therefore, the use of urea-formaldehyde fertilizer is especially important in saline soils with close groundwater occurrence, where significant nitrogen losses can be expected as a result of leaching of nitrates into the groundwater. In addition, the higher content of nitrates in the soil when applying standard tuks leads to significant nitrogen losses, the size of which reaches significant values. As a result, there are a number of problems of environmental pollution, since the greatest danger is the greater presence of nitrates in the soil. At the same time, nitrates accumulate not only in the soil - soils, ground water, but they accumulate above the permissible norm in food and feed and, consequently, enter the human and animal bodies.

Recent studies show that the intensive use of mineral fertilizers and chemical plant protection products for agricultural and medicinal crops, as well as various tillage systems, has activated microbiological processes and accelerated the cycle of nutrients. Under these conditions, the productivity of plants initially increased, while reducing humus substances in the soil due to a reduction in the amount of humification of plant residues and organic fertilizers. This led to a decrease in the protective function of humus substances as an adsorbent of toxic compounds and elements of mineral nutrition entering the soil, which was a limiting factor in increasing the yield of both agricultural and medicinal crops and reducing the effectiveness of mineral fertilizers, especially nitrogen [1,4,6,14].

The intensification of biological processes led not only to the destruction of soil organic matter, but also to the rapid transformation of amide and ammonia forms of nitrogen fertilizers into nitrates, followed by their leaching into groundwater and rivers, the development of denitrification, which contributed to an increase in gaseous unproductive losses of nitrogen from soil and fertilizers and their pollution of the natural environment [7,8,9,12]. All this contributed to a decrease in the efficiency of nitrogen fertilizers on agricultural and medicinal plants and a decrease in their effectiveness.

In this regard, the use of CFU plants under study in conditions of KG of saline light gray soils with close ground water occurrence is particularly acceptable from an ecological point of view than standard tuks.

4. CONCLUSIONS

1. It is established that CFU contributes to the preservation of ammonium nitrogen in the soil for a longer period, delays its nitrification, thereby reducing leaching, nitrates and osmotic pressure of the soil solution, which is reflected in improving the nitrogen nutrition of plants, accelerating growth processes, fruiting and increasing yield (biomass) relative to standard tuks (urea). The use of *Artemisia leucodes* Schrenk nitrogen from CFCs in the first year is less than from urea, and the reverse pattern is observed in the second year. Over two years, the amount of CFU nitrogen use is greater (by 11.8%) than in the control (47.0%>), while the amount of unproductive nitrogen losses from CFU decreases by 15.8% in relation to urea. It is important that when using CFCs for plants, their consumption of nitrogen from soil sources is reduced and thus the natural fertility of the soil is preserved.
2. When using CFCs together with urea (70 % in the form of CFCs before sowing, and 30 % in the form of urea in the budding phase), the use of nitrogen fertilizers by the Polyana whitish plant was greater than when they were applied to the soil separately.
3. Urea-formaldehyde nitrogen fertilizers increase the efficiency of nitrogen on plants and reduce unproductive nitrogen losses from the soil.
4. The results of our research have established that CFU increases the yield of plants. In field experiments conducted on unsalted irrigated typical serozem and meadow-serozem soil. There is a tendency for CFCs to be more effective on saline light than on non-saline typical serozem. All this points to the prospects of using slow-acting urea-formaldehyde fertilizers on *Artemisia leucodes* Schrenk.
5. The use of urea-formaldehyde fertilizers under *Artemisia leucodes* Schrenk helps to reduce the pollution of the environment with nitrates on typical unsalted serozem, gravelly serozem, especially in meadow-serozem soils, than the introduction of ammonia-nitrate forms of nitrogen.
6. Due to low leaching into ground water and low gas losses, the use of CFCs on gravelly serozem, compared to typical serozem, is a more effective fertilizer than urea.
7. Thus, the introduction of slow-acting nitrogen fertilizers (CFCs) in relation to urea reduces gaseous losses, as well as losses resulting from the leaching of nitrates into ground water, which is important in the conditions of hydromorphic, especially gravelly gray-earth soils in reducing environmental pollution with nitrates.

REFERENCES

- [1] Andreyuk E. I., Iutinskaya G. A., Derevcherov A. N., Soil microorganisms and intensive land use. Kiev, "Naukova dumka", 1988-114 p.
- [2] Bepalov N. F., Artamonova N. A., Seitumerov S. Complex polymer fertilizers on populated soils. Zh. "Chemical industry" 1985. vol. XIII, no. 4-54 p.
- [3] Zhukova O. V., Kalinina N. I. On the vertical movement of nitrate nitrogen in serozems. Proceedings of the Tajik Research Institute of Agriculture. VYK. 3 vol. VI, Dushanbe, 1975-180 p.
- [4] Zvyagintsev D. G. Soil and microorganisms. Moscow, MSU Publishing House, 1987-125 p.
- [5] Kovda V. Biochemical cycles in nature and their violation by man. M., "Nauka", 1975-59 p.
- [6] Kondratev K. N. Changes in soil fertility in the garden under the influence of twenty-year application of fertilizers. Rational use of soils in the Saratov region. Saratov, 1987-26 p.
- [7] Kudiyarov V. N., Benikin V. N., Kudiyarova A. Yu., Bochkarov A. N. Ecological problems of fertilizer application, Moscow, Nauka, 1984.
- [8] Kudiyarov V. N., Kudiyarova A. Yu., Ecological problems of mineral fertilizers application. Dokl. simp. II Delegate Congress of the ALL-Union. Societies of Soil Scientists. Tashkent, September 9-13, 1985. part 6
- [9] Kudiyarov V. N., Nikitishen V. I., Ecological consequences of agricultural intensification. Zh. "Agrochemistry", 1988, No. 8.
- [10] Kursanov A. JI. Internal organization of physiological processes in plants and new principles in crop production. Bulletin of the USSR Academy of Sciences, 1962, No. 9-68 p.
- [11] Madraimov I., Jalilov M. Efficiency of the use of urea-pharmaldigid fertilizers for cotton on serozems. In the collection "Application of fertilizers in cotton growing". Tashkent, Fan, 1966-84 p.
- [12] Mineev V. G., Ecological problems of agrochemistry. Study guide for students. universities on spec.

Agrochemistry., pochvovedenie. M., Ed. Moscow State University, 1988-135 p.

- [13] Ryzhov S. N., Pirakhunov T. P., Tashkuziev M. M., Aliev A. T. Nitrogen balance of fertilizers on typical serozem in cotton cultivation (according to lysimetric experiments) application of the stable isotope bN in agricultural research IV ALL-Union. coord. nauch. method, method. Tbilisi, 1979
 - [14] Tuev K. A. Microbiological processes of humus formation. M., Agroprom izdat., 1989-94 p.
 - [15] Khodzhiev T. Bairov A. Nitrogen of fertilizers and nitrification inhibitor in cotton growing, Tashkent, fan, 1992, p. 118.
 - [16] Yarovenko G. I., Umarov A. Actions of urea-pharmaldehyde fertilizers on the biological ability of soils, nitrate accumulation, cotton yield. Uzb. biol. journal, 1963, no. 6-46 p.
 - [17] Yarovenko G. I. Physiological and biochemical bases of increasing the efficiency of nitrogen fertilizers in cotton growing. Tashkent, Uzbekistan, 1969-176 p.
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