AGROINNOVASIYA jurnali
Volume 01, Issue 01, 2023 ISSN (E): xxxx-xxxx

INFLUENCE OF MINERAL AND ORGANIC FERTILIZERS AND PHOSPHOGYPSUM ON THE AMMONIA AND NITRATE NITROGEN IN THE SOIL
MINERAL VA ORGANIK O‘G‘ITLAR VA FOSFOGIPSNING TUPROQDAGI AMMIAK VA AZOTGA TA’SIRI.
ВЛИЯНИЕ МИНЕРАЛЬНЫХ И ОРГАНИЧЕСКИХ УДОБРЕНИЙ И ФОСФОГИПСА НА АММИАК И АЗОТ В ПОЧВЕ.

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Annotation: The article describes the effect of mineral and organic fertilizers and phosphogypsum on changes in soil fertility and ammonium and nitrate nitrogen levels due to application of irrigated barren-meadow soils of Surkhandarya region. According to the results of the study, taking into account the state of soil reclamation, the use of 30 t ha^{-1} of cattle manure and 2 and 4 t ha^{-1} of FG on the background of mineral fertilizers changed the soil fertility and agrochemical properties in a positive direction, and it was observed that the amount of nitrogen in the form of ammonium and nitrate in the soil increased compared to the control option. In $N_{250}P_{175}K_{125}$ background, 30 t ha^{-1} of manure and 2 and 4 t ha^{-1} of FG were used (9;10), the amount of nitrogen in ammonium form was 34,3 and 35,2 mg/kg in the 0-30 cm layer of the soil, respectively, compared to the control option. compared to 19,3 and 20,2 mg/kg, and the amount of nitrate nitrogen was 37,7 and 38,8 mg/kg, which was 22,3 and 23,4 mg/kg more than the control version.

Annotatsiya: Maqolada mineral va organik o‘g‘itlar hamda fosfogipsni(FG) Surxondaryo viloyatining sug‘oriladigan taqir-o‘tloqi tuproqlari unumdorligi va undagi ammoniyli hamda nitratli azot miqdorlari o‘zgarishiga ta’siri bayon etilgan. Tadqiqot natijalarining ko‘rsatishicha, tuproqning meliorativ holatini hisobga olgan holda mineral o‘g‘itlar fonida 30 t/ga qoramol go‘ngi hamda 2 va 4 t/ga FG ni qo‘llash tuproq unumdorligi va agrokimyoviy hossalarini ijobiy tomonga o‘zgartirib, tuproqdagi ammoniy va nitrat shakldagi azot miqdorini nazoart variantiga nisbatan ortishini ta’minladi. $N_{250}P_{175}K_{125}$ fonida 30 t/ga go‘ng hamda 2 va 4 t/ga FG qo‘llanilgan (9;10) variantlarda ammoniy shakldagi azot miqdori tuproqning 0-30 sm qatlamida mos ravishda 34,3 va 35,2 mg/kg ni tashkil etgan holda nazorat variantiga nisbatan tegishlicha 19,3 va 20,2 mg/kg ga yuqori, nitratli azot miqdori esa 37,7 va 38,8 mg/kg ni tashkil etib, nazorat variantiga nisbatan 22,3 va 23,4 mg/kg ga ko‘p bo‘ldi.

Аннотация: В статье рассмотрено влияние минеральных и органических удобрений и фосфогипса на изменение плодородия почвы и уровня аммонийного и нитратного азота при внесении в орошаемые такирно-луговые почвы Сурхандарьинской области. Результаты исследования показывают, что применение 30 т/га навоза крупного рогатого скота и 2 и 4 т/га ФГ на фоне минеральных удобрений, с учетом мелиоративного состояния почвы, изменило плодородие почвы и агрохимические свойства в положительную сторону, и отмечено, что содержание аммонийного и нитратного азота в почве увеличилось по сравнению с контрольным вариантом. На вариантах(9,10), где внесены 30 т/га навоза вместе с фосфогипсом (2 и 4 т/га) на фоне $N_{250}P_{175}K_{125}$, содержание аммонийного азота было 34,3 и 35,2 мг/кг в слое 0-30 см почвы, что на 19,3 и 20,2 мг/кг соответственно больше по сравнению с контролем, а количество нитратного азота составило 37,7 и 38,8 мг/кг, что на 22,3 и 23,4 мг/кг больше, чем в контроле.

Key words: Irrigated barren meadow soils, mineral and organic fertilizers, phosphogypsum, ammonium and nitrate nitrogen.

Kalit so'zlar: Sug'oriladigan taqir-o'tloqi tuproqlari, mineral va organik o'g'itlar, fosfogips, ammoniy va nitratli azot.

Ключевые слова: Орошаемые такирно-луговые почвы, минеральные и органические удобрения, фосфогипс, аммиачный и нитратный азот.

The development of agriculture, the preservation and improvement of soil fertility in our republic is one of the urgent problems of our time.

As the experiments showed, the introduction of composts into the soil, prepared by mixing bentonite in different norms and proportions at a rate of 21-24 t ha^{-1}, contributed to an increase in the number of mobile nutrients in it and their better assimilation by the plant. the amount of nitrate nitrogen in the soil layer of 0-30 cm compared with the control was 7. Its increase to 0,50 mg/kg was noted [1].

When applying compost prepared on the basis of manure, tobacco waste, cattle manure and phosphogypsum at a rate of 20-40 t ha^{-1}, a significant increase in the amount of ammonium and nitrate nitrogen absorbed by plants was observed on carbonate-magnesium saline soils. [2].

The agrochemical property of the soil determines the soil nutrition regime, and raising it to a higher level optimizes plant nutrition. Mineral and organic fertilizers play an important role in this. It is known from many studies that the nutrients in mineral fertilizers are important for plant nutrition and improved soil nutrition. Mobile nutrients in the soil represent its active nutrient regime. Because mobile nutrients are directly involved in plant nutrition and determine the mineral nutrition of plants. One of the most important nutrients are nitrogen compounds, which are absorbed by plants in the form of ammonium ions and nitrates. The study of the influence of various factors on their number is an urgent task.

Research methods. The field experience consists of 12 options, all options are arranged in 4 turns, 48 pegs and 2 tiers:

1) Fertilizer was not applied (control). 2) $N_{250}P_{175}K_{125}$ 3) 30 t ha^{-1} of manure. 4) 2 t ha^{-1} FG. 5) FG 4 t ha^{-1}. 6) 30 t ha^{-1} fertilizer + 2 t ha^{-1} FG. 7) 30 t ha^{-1} fertilizer + 4 t/ha FG. 8) $N_{250}P_{175}K_{125}$ +30 t ha^{-1} fertilizer. 9) $N_{250}P_{175}K_{125}$ +30 t ha^{-1} fertilizer + 2 t ha^{-1} FG. 10) $N_{250}P_{175}K_{125}$ +30 t ha^{-1} fertilizer + 4 t ha^{-1} FG. 11) $N_{250}P_{175}K_{125}$ +2 t ha^{-1} FG. 12) $N_{250}P_{175}K_{125}$ +4 t ha^{-1} FG. Experiments, selection and analysis of soil and plant samples were carried out in accordance with the methodological manual of UzPITI (1981) on the basis of the "Methodology of agrochemical, agrophysical and microbiological studies in the fields of cotton regions" (1963). Ammonium nitrogen (N-NH4) in the soil was determined using the Nessler reagent, and the amount of nitrate nitrogen (N-NO3)

Research results. Based on a three-year average of the study, in the no-fertilization variant, mobile nutrients in the soil decreased from early spring to July. In our studies, the amount of nitrogen in the ammonium form in the arable soil layer on May 15 was 15,0 mg/kg in the control, 25,3 mg/kg in the $N_{250}P_{175}K_{125}$ variant, and 22,2 mg/kg in the 30 t/ha variant of manure, 17,3 in the 2 t ha^{-1} FG variant and 17,4 mg/kg was found in the 4 t ha^{-1} FG variant, this figure was 8,3 and 8, respectively, in the 30 t ha^{-1} manure + 2 t ha^{-1} variants manure and 30 t ha^{-1} manure + 4 manure, respectively, 1 mg/kg increased. Against the background of mineral fertilizers, 30 t ha^{-1} of manure + 2 and 4 t ha^{-1} of FG were applied (9, 10), and the amount of nitrogen in the form of ammonium was 34,3 and 35,2 mg/kg, respectively. in the soil layer of 0-30 cm, its increase was noted by 19,3 and 20,2 mg/kg, respectively, compared with the variant (table). Of great importance in the nutrition of cotton is also the amount of nitrogen in the form of saltpeter. Because cotton absorbs nitrogen from the soil very well in the form of nitrates. In the unfertilized control, the content of nitrogen in the form of nitrate ($N\text{-}NO_3$) in the soil was very low and had seasonal fluctuations. As a result, in early spring and summer, the amount of nitrate naturally formed in the soil due to the nitrification process is large, and later, with the beginning of the growing season of plants, the amount of nitrogen in the form of nitrate began to increase. decrease and fall to a minimum level by the time of flowering and

fruiting. This situation may be related to the maximum absorption of nitrates by cotton during these periods. It should be noted that in all variants, regardless of agrotechnical measures, the amount of nitrate nitrogen in the soil increased from spring to summer, and decreased again at the end of the season. In the $N_{250}P_{175}K_{125}$–background variant, an increase in the amount of nitrate nitrogen in the soil was observed during the period of cotton growth, which ensured a high content of nitrates in the soil in this variant. 2 and 4 t ha^{-1} of phosphogypsum were applied against the background of 30 t/ha of manure applied under the plow and 2 and 4 t ha^{-1} of phosphogypsum on May 15, respectively, the amount of nitrate nitrogen was 25,6; 21,7 and 22,0 mg/kg ha, and by July 15, an increase in these values was observed.

The amount of nitrogen in the form of nitrates was 11,9 and 13,0 mg/kg ha compared with the control in variants (6; 7), where 2 and 4 t ha^{-1} of FG were applied against the background of 30 t ha^{-1} of manure on May 15 and 3; 1,7 for options 4 and 5 respectively; 5,6; 5,3 and 2,8; 6,7; It was found that it increased by

Influence of mineral and organic fertilizers and phosphogypsum on the amount of nitrogen in the form of ammonium (N-NH4) and nitrate (N-NO3) in the soil (2020-2022)

№	N-NH_4 quantity, mg/kg in the soil										($N-NO_3$) quantity, mg/kg in the soil									
	15.05		15.06		15.07		15.08		15.09		15.05		15.06		15.07		15.08		15.09	
	0-30	30-50	0-30	30-50	0-30	30-50	0-30	30-50	0-30	30-50	0-30	30-50	0-30	30-50	0-30	30-50	0-30	30-50	0-30	30-50
1	15,0	13,0	14,9	11,9	11,8	11,1	12,0	11,0	13,5	10,9	15,4	12,7	13,6	12,4	12,3	11,0	11,4	10,1	11,3	10,0
2	25,3	22,2	30,3	23,2	34,0	22,2	20,2	16,2	17,1	15,4	31,6	24,4	32,5	27,7	37,1	27,7	26,5	19,3	23,4	19,3
3	22,2	19,2	24,4	22,2	22,4	20,4	22,3	20,4	21,4	25,5	25,6	21,8	27,6	24,7	29,3	24,6	25,6	20,8	25,5	21,5
4	17,3	16,0	20,3	16,3	17,4	14,3	16,3	14,2	15,5	17,1	21,7	18,6	20,7	18,5	18,4	17,5	19,6	16,5	17,8	15,5
5	17,4	16,5	21,2	16,6	17,7	14,5	16,4	14,4	15,8	17,8	22,0	19,4	21,2	18,0	19,2	18,2	20,1	16,9	18,9	15,1
6	23,3	21,2	26,2	24,3	25,3	22,4	24,2	22,2	24,3	20,0	27,3	23,7	31,3	27,6	31,4	26,2	27,6	22,6	27,7	22,8
7	23,1	21,2	27,1	25,0	25,6	23,8	24,7	22,9	24,5	20,8	28,4	24,4	31,8	27,8	32,7	26,4	27,8	23,1	27,9	23,1
8	31,3	26,3	36,4	26,4	38,4	25,4	26,4	23,1	25,5	22,3	35,6	29,4	39,4	32,1	40,2	30,6	36,4	27,4	32,5	28,6
9	34,3	30,3	38,4	28,2	42,2	28,4	28,4	26,1	28,2	24,9	37,7	30,7	42,6	34,4	42,8	32,8	39,6	29,8	34,6	30,8
10	35,2	30,8	38,8	29,0	42,4	29,1	30,1	27,0	29,7	24,8	38,8	31,3	43,4	35,4	43,8	32,8	40,3	30,0	35,4	31,6
11	29,0	24,1	33,0	25,2	37,1	24,1	22,3	17,5	20,3	18,9	32,5	25,5	35,7	29,1	38,5	28,5	28,6	21,5	25,4	21,3
12	29,9	24,7	33,6	26,5	37,7	24,6	23,7	17,5	20,7	19,3	33,1	25,8	36,1	29,6	38,6	29,2	28,9	21,9	25,7	21,7

6.4 mg/kg. Against the background of mineral fertilizers, 30 t ha^{-1} of manure and 2 and 4 t ha^{-1} of FG were applied (9, 10), in which nitrate nitrogen was 37,7 and 38,8 mg/kg, compared with the control variant 22,3 and 38,8 mg/kg. 23,4 mg/kg and 30 t/ha manure + 2 t ha^{-1} FG and 30 t/ha manure + 4 FG increased by 10.4 and 9,3 and 11,5 and 10,4 mg/kg, respectively. The amount of nitrogen in the form of nitrate changed according to the same pattern until the end of the growing season (table).

The application of mineral fertilizers significantly increased the amount of nitrogen in the form of nitrate (N-NO3) in the soil. This situation was especially pronounced in the variants where 30 t ha^{-1} of

manure and 2 and 4 t ha^{-1} of phosphogypsum were used together against the background of mineral fertilizers. In these options, mineral and organic fertilizers and phosphogypsum, applied at different rates, had a positive effect on the agrophysical and absorption complex of the soil and created favorable conditions for plant growth in the soil.

This trend is also observed in the options where phosphogypsum is used at the rate of 2 and 4 t ha^{-1} against the background of mineral fertilizers ($N_{250}P_{175}K_{125}$), but it is optimal Compared to options (9-10), it was found that the amount of nitrogen in the form of nitrate is somewhat less. In general, according to the experiment, during the growth period of cotton, the increase in the amount of nitrogen in the form of nitrate in the soil occurred due to the activation of the nitrification process.

It can be concluded that, The introduction of 30 t ha^{-1} of cattle manure and 2 and 4 t ha^{-1} of phosphogypsum against the background of mineral fertilizers in irrigated barren meadow soils has a positive effect on the agrophysical, agrochemical and microbiological properties of the soil, leads to the activation of ammonification and nitrification processes, and ammonium and nitrate nitrogen in the soil increases the amount convincingly.

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