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Impact of norms of organo-mineral compost and mineral fertilizer on the productivity of soil and winter wheat

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Abstract
When winter wheat is planted continuously (monoculture) for 11 years and treated without fertilizers, the amount of humus in the topsoil (0-30 cm) is 41.5% higher than in the first year of the experiment, the total nitrogen content is 63.9%, 20 tons per hectare. humus content was reduced by 33.1%, total nitrogen content by 52.8%, humus content by 31.5%, total nitrogen by 50.0% when mineral fertilizers were applied at the rate of N_{200} P_{140} K_{100} kg / ha.

When winter wheat was cultivated continuously for 11 years in a field after 3 years of alfalfa, its grain yield was higher in the first three years after alfalfa, regardless of the type and amount of fertilizer, and in subsequent years the grain yield decreased sharply. When 20 tons of manure is applied per hectare, the grain yield is 35.3 centner / ha compared to the yield obtained in the first year, 36.3 ts / ha at the rate of N_{200} P_{140} K_{100} kg / ha, 32.0 centner / ha at the rate of N_{150} P_{105} K_{75} kg / ha, in the absence of fertilizer at all, yielded 37.0 centner / ha.

In the case of winter wheat with N_{180} P_{125} K_{90} kg / ha application rate with mineral fertilizers, the average grain yield was 47.8 ts / ha in three years, while in the case of N_{180} P_{125} K_{90} kg / ha application rate with mineral fertilizers + 15 t / ha with organo-mineral compost, the average grain yield was 62.4 ts / ha in three years, and only 14.6 centner / ha of additional grain yield was obtained compared to the variant in which only mineral fertilizers were applied. The protein content of winter wheat in the variant with the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha was 13.8%, the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha was + 15 t / ha with the use of organo-mineral compost - 14.6%. was found to be 0.8 per cent higher than the variant in which only mineral fertilizers were applied. It was also noted that the gluten content in the grain was 0.9% higher under the influence of compost, varying in the above order among the options.

Rice and wood chips-25%, manure-25%, chicken manure-35%, phosphogypsum-15% were added to prepare compost to determine the effect of semi-rotten black manure, nitrogen, phosphorus and potassium fertilizers on winter wheat yield and soil fertility. According to the experimental data, the grain yield of winter wheat was 51.2 centner / ha in the control variant of mineral fertilizers N_{200} P_{140} K_{100} kg / ha, while the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha was 10 + t / ha in compost. A grain yield of 59.5 centner / ha was obtained, which was 8.3 ts / ha higher than the control option. The norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha + 10 t / ha of black manure yielded 58.1 centner / ha of grain, which is 6.9 ts / ha higher than the control variant. In addition to the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha, in the variants using 20 t / ha of black manure and compost, an additional grain yield of 9.5-11.4 centner / ha was obtained compared to the control variant.

Soybeans grown as a secondary crop were treated with nitragin before sowing the seeds, and 56.6-58.4 t / ha of soybeans were harvested from winter wheat grown by using mineral fertilizers N_{30} $P_{90}K_{60}$ and N_{60} $P_{90}K_{60}$ kg / ha. Grain yield was 54.5-56.7 t / ha from winter wheat grown by application of mineral fertilizers N_{30} $P_{90}K_{60}$ and N_{60} $P_{90}K_{60}$ kg / ha without treatment with nitragin before sowing the seeds. Before sowing the seeds of soybeans grown as a secondary crop, 48.2 ts / ha of grain was obtained from the cultivated variant of winter in which there was not treated with nitragin and mineral fertilizers.

Keywords: Autumn wheat, soil fertility, monoculture, organo-mineral compost, manure, sawdust, phosphogypsum, mineral fertilizers, humus, nitrogen, phosphorus, potassium, seeds, fertility, seedling thickness, wintering rate, growth, development, protein, gluten, yield

Introduction

Cereals and grain products are among the most widely grown and consumed products in the world, among which wheat is one of the main crops. From time immemorial, along with its cultivation, high and stable yields, the issues of raising its important qualities in the national economy, especially for the food industry, have been relevant. In different soil and climatic conditions of the country, winter wheat is grown, and the main part of the grain harvest falls on irrigated lands. According to the biology of wheat, among cereal crops is a plant that requires soil fertility, local and mineral fertilizers, heat and water.

Currently, excluding secondary crops in our country, when main crops cotton and cereals once alternately planted 8-10 tons of organic matter at the expense of cotton crop and 11-12 tons of organic matter at the expense of cereal crops are released per 1 hectare of land, total 19-22 tons of organic matter during per rotation per 1 hectare are released. The total volume of local and mineral fertilizers applied to the soil does not exceed 1.5-2.0 tons, which leads to a decrease

in soil fertility from year to year. One of the main measures to maintain soil fertility in such conditions is to add as much organic fertilizer as possible to the soil.

To this end, the use of various organic composts, local and mineral fertilizers to study new aspects of grain growing, as well as research to determine the impact of continuous cultivation of winter wheat on soil fertility and grain yield.

Relevance of the problem

It is known that among mineral fertilizers, nitrogen fertilizers are of special importance, as they have a positive effect on the growth and development of winter wheat. It serves to accelerate the physiological processes that take place during the growth and development of the plant, maintains physiological control. In addition, phosphorus and potassium, as well as local fertilizers, moisture and heat are also of particular importance. In this regard, a number of scientists have conducted research in different soil-climatic conditions and given their conclusions.

According to the literature, at the expense of obtaining one ton of grain from winter wheat, it absorbs 35-40 kg of nitrogen, 15-20 kg of phosphorus and 40-45 kg of potassium from the soil. If 50 quintals of grain are harvested per hectare, 165-200 kg of nitrogen, 75-100 kg of phosphorus, 200-220 kg of potassium fertilizers will be required from the soil [2, 3, 4, 6, 11, 16, 19, 20].

Based on different soil and climatic conditions of the Republic of Uzbekistan, the optimal nutritional standards for winter wheat have been determined for irrigated agriculture, which in the Fergana region by Sh. Abdurakhimov to N_{200} P_{140} K_{100} kg/ha, in the conditions of Karakalpogiston Republic region by N. Ibragimov and L. Mirzaev to N_{180} P_{120} K_{90} kg/ha, in the conditions of Namangan region by N.M. Ibragimov, Sh.Z. Khakimov, L. Mirzaev N_{200} P_{140} K_{100} kg/ha, in the conditions of Navoi region by K.M. Muminov, Sh.E.Qodirov N_{150} P_{120} K_{50} kg/ha + 10 t / ha manure, in the conditions of Khorezm region by G.Satipov, S.Bobojonova it is recommended to use mineral fertilizers at the rate of N_{200} P_{120} K_{120} kg/ha. The authors note that the sharp differences in the proportions and norms of NPK fertilizers also depend on soil and climatic conditions [1, 9, 10, 14, 15].

Crops absorb 66 percent of the manure applied in the first year, 30 percent in the second year, and 10 percent in the third year. In addition, 55% of the applied phosphorus fertilizers are used by crops in the first, 30% in the second, 15% in the third year, 70% of potassium fertilizers are used in the first and 30% in the second year. Nitrogen fertilizers are absorbed in the first year. This is because nitrogen fertilizers are very mobile and are consumed quickly [11].

According to Sh.Mekhmonov, in the light gray soils of Kashkadarya region before sowing of winter wheat "Kupava" 30 t / ha of rotted manure was applied to the soil, feeding with mineral fertilizers significantly increased grain yield and 50-60 t / ha of winter wheat.The author notes that the application of 30 t / ha of manure under the autumn plow before planting winter wheat allows to reduce the recommended amount of mineral fertilizers for its maintenance from $N_{180}P_{90}K_{60}$ kg / ha to $N_{150}P_{70}K_{50}$ kg / ha to the norm and ratio [13].

According to T. Toshkhodjaev, in addition to manure, nitrogen and phosphorus fertilizers should be applied to the soil when sowing autumn crops. In the study of old irrigated gray soils of Tashkent region, in addition to 20 tons of manure, the application of mineral fertilizers in the amount of N_{60} P_{30} kg / ha allowed to increase grain yield by 12.6 quintals per hectare [17].

In the joint experiments of F.Khoshimov, T.Ortikov and N.Boboeva, when composts made of mineral fertilizers, semi-rotten cattle manure, tobacco waste, phosphogypsum and manure were applied to winter wheat, magnesium carbonate saline meadow soils improved agrochemical properties, nutrition and autumn steam. has been shown to improve growth and development, increase yield and crop quality, and this compost can replace traditional organic fertilizer semi-rotten cattle manure by its effects [18].

Research conditions and Methods

Our research provides information on the typical ice of the Tashkent region and the riches of the Andijan region from 1997 to 2018.

The first field experiment was conducted between 1997 and 2008 in the conditions of the old irrigated typical shrubs of Tashkent region, which are the second most talented side and supporters of the soil in the cultivation of continuous wheat. The same approximation includes 4 options, each of which is 2000 m^2. Once the field experiment was repaired, the existing Experiments tested the norms of fertilizer (possible), up to 20 t / ha, mineralized N_{200} P_{140} K_{100} kg / ha and N_{150} P_{105} K_{75} kg / ha.

The second field experience is not N_{180} P_{125} K_{90} kg / ha in the autumn season, if it is not provided with money, according to the data provided by experts on combating the population of Andijan region to combat the fighting in 2012-2016.

Organo-ore compost was prepared on the basis of cattle manure and phosphorus fertilizer (NKFU). In this case, 1 ton of manure was mixed with 10% phosphorus fertilizer, mixed and stored in 2-meter-high piles for 4 months, covered with a 10 cm layer of soil. According to the experimental system, organo-mineral compost was applied under autumn plowing before sowing winter wheat. It was found to contain 0.5% total nitrogen, 0.28% phosphorus and 0.7% potassium.

The third field experiment was conducted in 2011-2014 in the conditions of the old irrigated gray soils of Tashkent region. the options used were studied. And also there was analyzed options of application of N_{200} P_{140} K_{100} kg / ha mineral fertilizer, 10-20 t/ha cattle manure and compost in autumn wheat. In the preparation of compost, rice and wood chips were taken in the ratio of 25 percent, manure-25 percent, chicken manure-35 percent, phosphogypsum-15 percent, mixed and stored in piles of 2 meters in height for 4 months, covered with a 10 cm layer of soil. According to the experimental system, compost and black manure were applied under the autumn plow before planting winter wheat.

The fourth field experiment was conducted in 2015-2018 in the conditions of the old irrigated light gray soils of Andijan region. Before sowing soybean seeds as a repeat crop, the following fertilizer-free, N_{30} P_{90} K_{60}, N_{60} P_{90} K_{60} and N_{90} P_{90} K_{60}, kg / ha norms of mineral fertilizers were tested on backgrounds treated with nitragin in *Bradyrhizobium japonicum SB5* strain and not applied. In these created backgrounds, winter wheat was cultivated. The norm of mineral fertilizers NPK 200: 140: 100 kg / ha was applied in winter wheat.

In all of the above field experiments, ammonium nitrate (N 33-34%), superphos (N 5-6%, R2O5-22-23%) and

potassium chloride (K2O-60%) fertilizers were used from mineral fertilizers.

Placement, calculations and observations of field experiments were carried out on the basis of methodical manuals "Methods of conducting field experiments", analysis of soils and plants "Methods of agrochemical analysis of soil and plants" [7, 8, 12].

Research results

Field experiments on continuous wheat cultivation in the conditions of typical gray soils of Tashkent region in 1997-2008 were carried out in the fields of the experimental plot of the Research Institute of Cotton Breeding, Seed Production and Agrotechnology. In this experiment, the effect of mineral and local fertilizers on soil fertility, growth, development and yield of continuous wheat was determined.

The experiment began in the fall of 1997, when winter wheat was planted in a well-cultivated field after 3 years of alfalfa.

According to the analysis of the initial agrochemical properties of the soil, the amount of humus in the 0-30 cm layer of soil was 1,300%, total nitrogen 0.180%, and total phosphorus 0.140%. As a result of successive sowing of winter wheat in one field, ie at the end of the 11th year of the experiment, the amount of humus in the soil increased by 0.430% in the first variant (33.1% compared to the first case) and 0.410% in the second variant (31), 5%), in the third, fertilizer-free control option by 0.540% (41.5%), in the fourth option by 0.505% (38.9%), and the total nitrogen content was 0.095% (52.8%) - 0.090%, respectively. (50.0%) - 0.115% (63.9%) - 0.105% (58.3%).

It can be seen that although 20 t / ha of manure is applied annually in winter wheat cultivation, continuous sowing of winter wheat in one field increases the amount of humus in the soil by 33.1% relative to the initial state (100%), N_{200} P_{140} K_{100} kg / ha per year and fertilizer application decreased by 31.5% (Table 1).

Table 1: Influence of continuous wheat cultivation on soil fertility and winter wheat yield

№	Experiment options	Soil layer, sm	Initial indicators, % (1997 y, autumn)			2008 year, summer, % (11-year end)			Grain harvest, centner/ha	
			humus	nitrogen	phosphorous	humus	nitrogen	phosphorous	In 11 year average	Difference according to the control
1	Manure, 20 t/ha per year	0-30	1,300	0,180	0,140	0,870	0,085	0,110	23,7	9,1
		30-50	1,075	0,120	0,100	0,800	0,079	0,100		
2	N_{200} P_{140} K_{100} kg/ha	0-30	1,300	0,180	0,140	0,890	0,090	0,124	27,4	12,8
		30-50	1,075	0,120	0,100	0,790	0,085	0,113		
3	Without fertilizer (control)	0-30	1,300	0,180	0,140	0,760	0,065	0,095	14,6	-
		30-50	1,075	0,120	0,100	0,700	0,058	0,083		
4	N_{150} P_{105} K_{75} kg/ha	0-30	1,300	0,180	0,140	0,795	0,080	0,100	23,2	8,6
		30-50	1,075	0,120	0,100	0,700	0,074	0,94		

As mentioned, since winter wheat was planted after 3 years of alfalfa, its growth, development and yield in the first year were high. At the end of the growing season, in the first variant, where 20 t / ha of manure was applied and the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha, the plant height was 84.3-86.2 sm, the number of productive stems was 450.4-462.6 m^2 / ha, 1000 grain weight 36.2-37.4 g. The grain yield was 58.8-62.4 centner / ha. Even in the control variant, where no fertilizer was applied, a grain yield of 51.3 ts / ha was obtained from winter wheat. As a result of successive planting of winter wheat in one field, the plant height, total and number of productive stems, weight of 1000 grains and other biometric indicators have been declining over the years. In recent years, the dynamics of declining winter wheat grain yields has taken the following form.

Although the data obtained on the grain yield of winter wheat in the 1st variant of the experiment were observed to be close to each other (58.8-57.1-55.4-52.7 centner / ha) in the 1st, 2nd, 3rd, 4th years of the study, In the 5th, 6th and 7th years, a sharp decrease in productivity was observed (44.3-32.5-25.2 centner / ha). In 8th, 9th, 10th years, grain yield was slightly higher than in 5th, 6th, 7th years (28.2-26.4-28.2 centner / ha). It was found that the yield of winter wheat decreased sharply (23.5 centner / ha) by 11 years. Although winter wheat was treated with 20 t / ha of manure per year, the yield in 2002 was 14.5 t / ha compared to 1998, 26.3 t / ha in 2003, 33.6 t / ha in 2004, and 2008. and decreased by 35.3 ts / ha.

In the variants where the annual norms of mineral fertilizers N_{200} P_{140} K_{100} kg / ha and N_{150} P_{105} K_{75} kg / ha are applied, a special pattern is observed, and we can observe that the grain yield decreases by the same amount over the years. In the control variant, a sharp decrease in grain yield was observed from the third year of the experiment.

According to the data on the average grain yield (average in eleven years), in the variant where 20 t / ha of fertilizer is applied, the yield is 23.7 centner / ha, additional yield 9.1 centner / ha compared to control, mineral fertilizers N_{200} P_{140} K_{100} and N_{150} P_{105} K_{75} kg / ha were 27.4 and 23.2 centner / ha in the applied variants, and 12.8 and 8.6 centner / ha in the additional variant compared to the control variant.

The second field experiment was carried out in the conditions of the old irrigated gray soils of Andijan region, the soil of the experimental field is an old irrigated light gray, the mechanical composition is sandy, the groundwater is located at a depth of 4-5 meters.

Organo-mineral compost, nitrogen, phosphorus and potassium fertilizers applied to the germination rate of winter wheat were found to be affected.

It should be noted that in the 1st year of the study (2012), winter wheat was sown on October 24, in the 2nd year on October 13, and in the 3rd year on October 21. Sprouting rates of seedlings began 6 days after planting and observations were continued every 3 years. Among the research years, 2013 saw relatively high figures.

Thus, in 2013 (field 2), the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha in winter wheat was 18.5% in the 1st period

of observation in option 1, while the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha in the 1st period of observation. It was found that in the 2nd variant, where the norm of + 15 t / ha of organo-ore compost was applied, this figure was 19.1%, which is 0.6% higher than in the 1st variant. This can be considered as one of the optimal effects of the applied organo-mineral compost.

This is because organo-mineral compost (hereinafter referred to as "compost") has been found in many studies to improve the water-physical properties of soil (soil temperature, bulk density, water permeability) [5, 14,18].

In the 3rd period of observation (October 25), the above figures were 48.5% in variant 1, 50.2% or 1.7% higher in variant 2, where compost was applied, and in the last period of observations (November 2). Was 91.8%.

It should be noted that although the observations lasted for 15 days, the germination rate of seeds was higher in the range of 1.5-3.0% in periods 1 and 5 in the variant where compost was applied.

Studies have shown that mineral fertilizers and organo-mineral composts used in winter wheat affect its wintering rate and seedling thickness. The rate at which winter wheat emerges from winter, i.e., dies less than on cold days, depends primarily on the biological characteristics of each crop.

In our research, the winter wheat variety Krasnodar-99 was planted, and many studies have shown that this variety has a better winter yield than other varieties. We determined the effect of composts, in the conditions of 2014 (field 2) (because this field was planted in autumn 2013) the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha should be applied, in variant 1 the seedling thickness at the beginning of winter wheat was 340.1 m^2 / pieces, after the winter these figures were 306.0 m^2 / piece. This means that 10.0% of seedlings died during the winter.

By the end of the application period, the actual seedling thickness was 280.7 m^2 / piece. This means that 26.0 m^2 / unit of plants were destroyed during the winter wheat application period.

N_{180} P_{125} K_{90} kg / ha norm of mineral fertilizers in winter wheat +15 t / ha compost was applied. it was observed that the norm of fertilizers N_{180} P_{125} K_{90} kg / ha was 12.5 m^2 / piece more than the applied variant. It should be noted that even at the beginning of the application period, only mineral fertilizers were used, which was 10.7 m^2 / unit more than in Option 1.

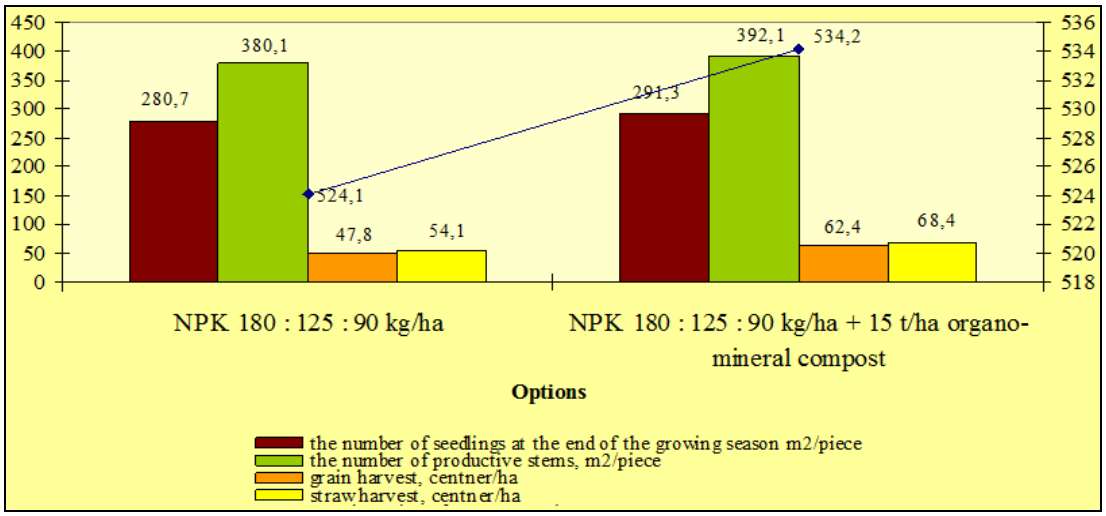
This indicates that the seeds of winter wheat germinated not only faster under the influence of applied compost, but also had a higher number of seedlings. This was also reflected in the number of plants that died in the winter, with 0.8% more seedlings remaining under the optimal exposure to compost.

The actual seedling thickness during the period of application of winter wheat was also more than 10.6 m^2 / piece, differing by 106.0 thousand pieces per 1 hectare.

It should be noted that these differences between seedling thicknesses of winter wheat did not significantly affect grain yield. However, the increase in germination rate of winter wheat seeds under the influence of compost and the relative decrease in the number of seedlings killed in winter create favorable conditions for optimal growth and development of the plant during the growing season, as evidenced by the data obtained in winter wheat.

It should also be noted that the effect of compost and mineral fertilizers on its growth, development and biometric measurements (excluding actual seedling thickness) was determined only if the effect of applied compost on germination and wintering rate of winter wheat seedlings was observed. However, the options again differ only in the application of compost. Therefore, in the 1st period of phenological observations in 2014 (field 2), the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha was applied. In variant 1, the plant height in winter wheat was 12.3 sm, in addition to the norm of 15 t / ha. In 2 variants where compost was applied, this figure was 13.1 sm and 0.8 sm higher.

At the end of phenological observations, in the 1st variant, where the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha was applied, the plant height was 86.8 cm, the total number of stems was 524.1 m^2 / grain, including the number of productive stems was 380.1 m^2 / grain. Against the background of the above mineral fertilizers, in compost 2, where 15 t / ha of compost was applied, it was found that these figures were 90.1 sm, 534.2 m^2 / piece, and 392.1 m^2 / piece, respectively (Fig. 1).



HCP_{05}=1,64 centner/ha, 2,94 %

Fig 1: The effect of application of mineral fertilizers and organo-mineral compost in winter wheat on its seedling thickness, total and productive number of stalks, and grain and straw yields (2014).

Hence, under the effect of 15 t / ha compost applied in winter wheat, the height of the plant height was 10.3 sm higher than in the variant where only mineral fertilizers were applied.

Continuing the above considerations, it should be noted that the number of productive stalks under the compost effect of 15 t / ha applied in winter wheat increased by 12.0 units compared to the variant using only mineral fertilizers.

It was observed that the norms of mineral fertilizers and compost affected the yield of winter wheat grain, and in 2013-2015 the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha was 47.8 on average from three replicates in the applied variant; 48.1 and 47.5 centner / ha, respectively. According to these data, between the years of the study, the harvest in 2014 was slightly higher than in other years due to the relatively favorable climatic conditions.

In the case of winter wheat, the average yield of mineral fertilizers was N_{180} P_{125} K_{90} kg / ha, with an average grain yield of 47.8 t / ha in 3 years, and the rate of mineral fertilizers N_{180} P_{125} K_{90} kg / ha + 15 t / ha of organo-mineral compost. A grain yield of 62.4 centner / ha was obtained, with an additional grain yield of 14.6 centner / ha compared to the variant in which only mineral fertilizers were applied. Thus, under the influence of 15 t / ha of applied compost, the grain yield of winter wheat increased by 14.6 t / ha due to the fact that the compost contained 75 kg / ha of total nitrogen. In addition, the acceleration of microbiological processes in the soil due to organic matter (humic, fulvic acids) in the compost is reported in many literature. Only the effect of additional nitrogen in the compost content of 75 kg / ha indicates that it has increased the utilization rate of NPK fertilizers applied by plants in their gall.

The protein content of winter wheat grain was 14.6% in the variant of mineral fertilizers N_{180} P_{125} K_{90} kg / ha + 15 t / ha with compost, and only mineral fertilizers themselves were found to be 0.8% higher than the variant used.

Our third field experiment was conducted in the conditions of typical irrigated gray soils of Tashkent region. In this field experiment, the norms of mineral fertilizers N_{200} P_{140} K_{100} kg / ha in winter wheat and in addition to the norms of these mineral fertilizers, the options for the use of 10, 20 t / ha of semi-rotten black manure and compost were studied. Compost and semi-rotten black cow manure were applied under the plow before planting winter wheat.

In our research, it was found that the application of compost and semi-rotten cattle manure in different amounts under the autumn plow before planting in the care of winter wheat affected the amount of nutrients in the soil.

In order to determine the initial agrochemical composition of the soil of the experimental field, soil samples were taken for analysis from 5 points diagonally from 0-30 and 30-50 sm layers of soil before the experiment.

According to the data obtained, the humus content in the 0-30 sm soil layer of the studied field was 0.925%, the total nitrogen content was 0.093% and the total phosphorus content was 0.133%. In the subsoil 30-50 sm layer, the humus content in the soil was 0.782%, the total nitrogen content was 0.080%, and the total phosphorus content was in the range of 0.110%. According to the data obtained on the mobile forms of nutrients, the amount of nitrate nitrogen in the topsoil (0-30 sm) layer is 14.6 mg / kg, in the subsoil (30-50 sm) layer is 11.2 mg / kg, the amount of mobile phosphorus is 0 26.3 mg / kg in the -30 sm layer and 21.0 mg / kg in the 30-50 sm layer. The amount of exchangeable potassium was 260 mg / kg in the 0-30 sm layer of soil and 230 mg / kg in the 30-50 sm layer.

It can be seen that the typical gray soils of the experimental plot of the Tashkent State Agrarian University were very low in nitrogen, low in phosphorus and moderately supplied with exchangeable potassium.

According to the data obtained at the end of the winter wheat application period, the amount of humus in the soil in the 0-30 sm layer was 0.922%, the total nitrogen content was 0.091% and the total phosphorus content was 0.130% in the control variant where mineral fertilizers N_{200} P_{140} K_{100} kg / ha were applied. was found to have reached In addition to the norm of mineral fertilizers in winter wheat, the application of semi-decomposed black manure and compost in different amounts had a positive effect on the amount of nutrients in the soil. In Option 2, where 10 t / ha of semi-rotted black manure was applied under winter plowing before sowing of winter wheat, humus content in the soil increased by 0.013%, total nitrogen by 0.001%, and total phosphorus by 0.003%, in addition to mineral fertilizers. In the variant where manure was applied at 20 t / ha, it was found that these values increased by 0.027, 0.004, 0.008 percent, respectively (Table 2).

In addition to the recommended norms of mineral fertilizers N_{200} P_{140} K_{100} kg / ha in winter wheat, in option 4, where 10 t / ha compost was applied, the amount of humus in the soil increased by 0.018%, total nitrogen by 0.003%, total phosphorus by 0.005%. in option 5, where 20 t / ha of compost was applied in addition to the norm, it was found that these figures increased by 0.034, 0.005, 0.011 per cent, respectively.

According to the data obtained on the mobile forms of nutrients in the soil, in the control variant with the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha in winter wheat, the amount of $N\text{-}NO_3$ in the soil in the 0-30 sm layer is 13.9 mg / kg, P_2O_5 25.1 mg / kg, While the amount of K_2O was 255 mg / kg, in addition to the recommended norm of mineral fertilizers in winter wheat, the amount of $N\text{-}NO_3$ in the soil in 0-30 sm layer was 16.4 mg / in option 2, which applied 10 t / ha of semi-rotten black manure. kg, the amount of P_2O_5 was 28.4 mg / kg, and the amount of K_2O was 268 mg / kg. In addition to the mineral fertilizer standards, 20 t / ha of black manure was applied. In option 3, the amount of $N\text{-}NO_3$ in the soil in the 0-30 sm layer was 18.3 mg / kg, the amount of P_2O_5 was 29.6 mg / kg, and the amount of K_2O was 275 mg / kg formed.

Table 2: Influence of application of local and mineral fertilizers in winter wheat on nutrient content in soil (2012)

№	The norm of local and mineral fertilizers	Soil layer, sm	The general form of nutrients, %			The mobile form of nutrients, mg/kg		
			humus	nitrogen	phosphorous	$N\text{-}NO_3$	P_2O_5	K_2O
1	N_{200} P_{140} K_{100} kg/ha	0-30	0,922	0,091	0,130	13,9	25,1	255
		30-50	0,780	0,079	0,108	10,6	20,2	223
2	N_{200} P_{140} K_{100} kg/ha + 10 t/ha manure	0-30	0,938	0,094	0,136	16,4	28,4	268
		30-50	0,786	0,082	0,113	12,0	22,1	237
3	N_{200} P_{140} K_{100} kg/ha + 20 t/ha manure	0-30	0,952	0,097	0,141	18,3	29,6	275

		30-50	0,790	0,085	0,117	13,1	23,0	243
4	$N_{200}P_{140}K_{100}$ kg/ha + 10 t/ha compost	0-30	0,943	0,096	0,138	17,0	29,0	270
		30-50	0,788	0,083	0,115	12,6	22,8	239
5	$N_{200}P_{140}K_{100}$ kg/ha + 20 t/ha compost	0-30	0,959	0,098	0,144	19,0	30,1	280
		30-50	0,793	0,086	0,119	13,8	23,7	250

In addition to the recommended N_{200} P_{140} K_{100} kg / ha mineral fertilizer standards for winter wheat, the amount of N-NO_3 in the soil was 17.0 mg / kg in the 0-30 cm layer, and the P_2O_5 content was 29.0 mg / kg in 10 t / ha compost. The amount of K_2O was 270 mg / kg, while in variant 5, where 20 t / ha of compost was applied, the amount of N-NO_3 in the soil was 19.0 mg / kg in the 0-30 cm layer, the amount of P2O5 was 30.1 mg / kg, and the amount of K_2O while 280 mg / kg.

Semi-rotted black cattle manure, compost, nitrogen, phosphorus, and potassium fertilizers applied to the germination rate of winter wheat were found to be affected.

It should be noted that in the 1st year of the study (2011) winter wheat was planted on 16 October, in the 2nd year on 11 October and in the 3rd year on 14 October. Sprouting rates of seedlings began 6–7 days after planting, and observations were continued every 3 years. Among the research years, 2012 saw relatively high figures.

Thus, in the control variant in which the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha should be applied in winter wheat in 2012 (field 2), the germination rate of seeds in the 1st period of observation was 19.6%, while the above mineral fertilizers N_{200} P_{140} K_{100} In variant 4, where the norm of kg / ha + 10 t / ha of compost was applied, this figure was found to be 20.5%, which is 0.9% higher than in variant 1. The norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha + 10 t / ha of black manure was applied in the 2nd variant, which was 20.1%, which is 0.5% higher than in the 1st variant. In addition to the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha, 20 t / ha of black manure and compost were used, and in options 3 and 5, seed germination was 0.8-1.2% higher than in the control option. This can be attributed to the optimal effect of the applied semi-rotten black cow manure and compost.

In the 3rd period of observation (October 26), the above figures were 50.1% in Option 1, 52.0-52.8% in Option 3, 5 with compost, and 2, 4 with black manure. 51.3-52.1%.

According to the results of the last period of observations (November 1), the germination rate of seeds in the control variant was 80.5%, while the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha + 10 t / ha compost was 4 in variant 4., 9%, which is 2.4% higher than option 1. The norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha + 10 t / ha of black manure was applied in the 2nd variant, which was 82.0%, which is 1.5% higher than in the control variant. In addition to the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha, 20 t / ha of black manure and compost were used, and in options 3 and 5, seed germination was found to be 2.9-3.7% higher than in the control option. This can be attributed to the optimal effect of the applied black manure and compost (Fig. 2).

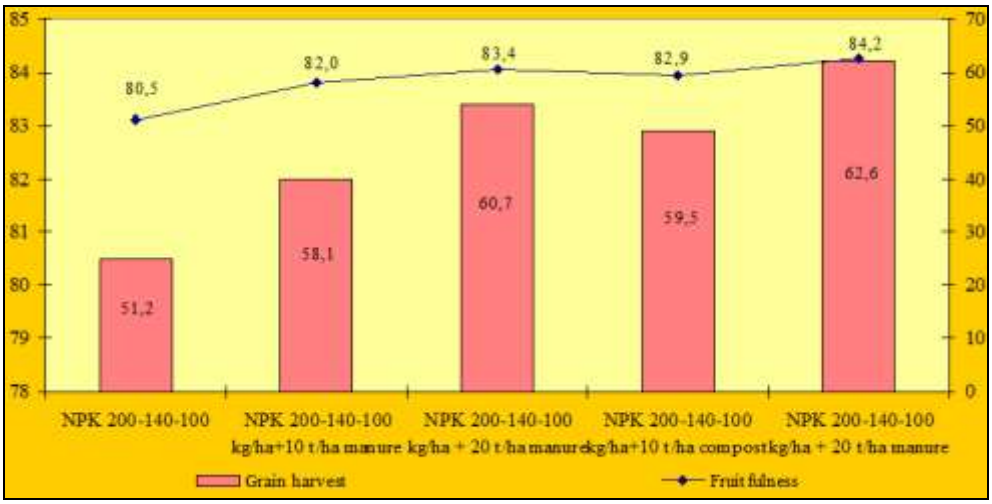


Fig 2: Influence of application of mineral fertilizers and compost on germination of winter wheat seeds in field conditions and grain yield (2012).

According to the data on the grain yield of winter wheat, the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha was obtained in the control variant with a grain yield of 51.2 centner / ha, the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha + 10 t / ha of compost was applied. 59.5 centner / ha of grain was obtained from the variant, which was found to be 8.3 centner / ha higher than the control variant. The norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha + 10 t / ha of black manure was obtained from the 2nd variant, 58.1 centner / ha of grain yield was obtained, which is 6.9 centner / ha higher than the control variant. In addition to the norm of mineral fertilizers N_{200} P_{140} K_{100} kg / ha, 20 t / ha of black manure and compost were used, and in options 3 and 5, an additional grain yield of 9.5-11.4 centner / ha was obtained compared to the control option.

Our fourth field experiments were conducted in 2015-2018 in the conditions of the old irrigated light gray soils of Andijan region. The mechanical composition of the experimental field soils is sandy, the groundwater is at a depth of 4-5 meters, not saline.

In the experiment, before sowing soybean seeds as a repeat crop, the following fertilizer-free, P90 K60, N30 R90 K60, N60 R90 K60 and N90 P90 K60 kg / ha norms of mineral fertilizers were tested on backgrounds treated with nitragin

in *Bradyrhizobium japonicum SB5* strain and not applied. In these created backgrounds, winter wheat was cultivated. The norm of mineral fertilizers $N_{200}P_{140}K_{100}$, kg / ha was applied in winter wheat.

In the soybean crop grown as a secondary crop, seed samples were isolated for analysis after the grain harvest of winter wheat grown on the backgrounds created by the application of mineral fertilizers at different rates. It was found that the germination capacity and level of winter wheat seeds in the laboratory were affected by nitragin treatment and application of mineral fertilizers in different doses before sowing soybean seeds grown as a repeat crop. To determine the germination of seeds in the laboratory, they were placed in a thermostat at a temperature of +22 ^{0}C, the germination capacity of the seeds was determined on the third day, and the germination rate was determined on the fifth day (Table 3).

According to the study, in the first year of the experiment, high germination capacity and level of autumn wheat seed samples were treated with nitragin before sowing soybean seeds grown as a repeat crop, and mineral fertilizers were applied to backgrounds of $N_{30}P_{90}K_{60}$ and $N_{60}P_{90}K_{60}$ kg / ha. observed in wheat sown variants, it was found that the germination capacity of the seeds was 94-95% and the germination rate was 100%. In the case of winter wheat, the germination rate of seeds is 93-94%, and the germination rate is 98-99% in the backgrounds where the norms of mineral fertilizers N_{30} P_{90} K_{60} and N_{60} P_{90} K_{60} kg / ha are applied without nitrogen treatment before sowing soybean seeds as a repeat crop. formed.

The lowest rates of germination capacity and level of seeds in the laboratory were observed in the case of winter wheat cultivated against nitragin and mineral fertilizers before sowing soybean seeds grown as a secondary crop, the germination capacity of seeds was 90% and germination rate was 95%. The seeds of soybean were treated with nitragin before sowing, and in the case of winter wheat cultivated in the absence of mineral fertilizers, the germination capacity of seeds in the laboratory was 91%, and the germination rate was 96%.

Before sowing soybean seeds grown as a secondary crop, it was found that the germination capacity of winter wheat seeds treated in the 2nd variant, which was not treated with nitragin and mineral fertilizers $P_{90}K_{60}$ kg / ha, was 91% and the germination rate was 97%, the soybean seeds were treated with nitragin before sowing, and the germination rate of the cultivated winter wheat seeds in Option 7, where mineral fertilizer rates of $P_{90}K_{60}$ kg / ha were applied, was 93% and the germination rate was 98%.

Table 3: Effect of application of nitragin and mineral fertilizers in the shade of repeated crops on the germination capacity and level of winter wheat seeds in the laboratory, %

№	Norms of mineral fertilizers, kg/ha (NPK)	2015-2016 years		2016-2017 years		2017-2018 years	
		Germination power (third day)	Germination rate (fifth day)	Germination power (third day)	Germination rate (fifth day)	Germination power (third day)	Germination rate (fifth day)
1	Without fertilizer	90	95	92	96	88	94
2	$P_{90}K_{60}$	91	97	93	98	90	96
3	$N_{30}P_{90}K_{60}$	93	98	94	99	91	97
4	$N_{60}P_{90}K_{60}$	94	99	95	98	92	98
5	$N_{90}P_{90}K_{60}$	93	98	94	97	91	97
6	Nitragin (without fertilizer)	91	96	93	97	90	96
7	$P_{90}K_{60}$ + Nitragin	93	98	94	99	91	97
8	$N_{30}P_{90}K_{60}$ + Nitragin	95	100	96	100	93	99
9	$N_{60}P_{90}K_{60}$ + Nitragin	94	100	96	100	92	98
10	$N_{90}P_{90}K_{60}$ + Nitragin	94	99	95	98	92	98

In variants 5 and 10, where high N_{90} P_{90} K_{60} kg / ha mineral fertilizers were applied during the care of soybeans grown as a secondary crop, it was found that the germination capacity of winter wheat seeds under laboratory conditions was 93-94% and germination rate was 98-99%. In the remaining years of the experiment, these laws were maintained.

It was found that the degree of overwintering of winter wheat and seedling thickness were affected by pre-sowing treatment of soybean seeds grown as a secondary crop with nitragin and application of mineral fertilizers in different doses.

Seedling thickness in winter wheat was determined three times, at the beginning of the application period, after the winter and at the end of the application period. The results showed that the seedling thickness was high at the beginning of the application period and decreased after the winter and at the end of the application period compared to the beginning of the application period. This, in turn, has been found to depend on varietal characteristics, temperature, light, soil fertility, nutrition, and a number of other influencing factors.

According to the experimental data, the maximum number of bushes in winter wheat (at the beginning of the application period) was treated with nitragin before killing soybean seeds grown as a repeat crop, and winter wheat was planted on backgrounds with mineral seeds $N_{30}P_{90}K_{60}$ and $N_{60}P_{90}K_{60}$ kg / ha, Observed in 9 variants- 345.8-352.4 m^2 / pcs. It was found that 336.5-345.1 m^2 / piece of winter wheat was sown in the 3rd and 4th variants against the backgrounds of mineral crops $N_{30}P_{90}K_{60}$ and $N_{60}P_{90}K_{60}$ kg / ha without treatment with nitragin before planting of soybean seeds as a repeat crop (Table 4).

At the beginning of the application period in winter wheat, the lowest number of bushes was observed in Option 1, where winter wheat was treated with nitragin and mineral fertilizers were not applied before sowing soybean seeds grown as a repeat crop. The seeds of the cultivated soybean were treated with nitragin before sowing, and in the 6th variant of winter wheat cultivated against a background

without the use of mineral fertilizers, it was found that 329.9 m^2 / piece.

Considering the data obtained on the number of plants perished in winter, the lowest rate was observed in variant 9 - 9.0 %, where winter wheat was sown against the background of mineral fertilizers treated with nitragin before sowing soybean seeds grown as a secondary crop, N_{60} P_{90} K_{60} kg / ha. Repeated crop soybean seeds were treated with nitragin before sowing, and the rate of mineral fertilizers N_{30} P_{90} K_{60} kg / ha was also good in the 10th variant planted with winter wheat against the background - 9.6%. The highest number of plant deaths in winter was observed in Option 1, where winter wheat was cultivated against nitragin and mineral fertilizers before sowing soybean seeds grown as a secondary crop, and was found to be 12.4%.

Table 4: Effect of application of nitragin and mineral fertilizers in the shade of repeated crops on seedling thickness and wintering rate of winter wheat

№	Norms of mineral fertilizers, kg/ha (NPK)	Seedling thickness (a number of pieces), m^2/pieces		A number of pieces perished in winter, %	Thickness of seedling at the end of experiment, m^2/pieces
		At the beginning of experiment, m^2/pieces	After winter, m^2/ pieces		
1	Without fertilizer	320,0	280,2	12,4	272,4
2	P_{90} K_{60}	328,3	290,2	11,6	283,6
3	N_{30} P_{90} K_{60}	336,5	299,0	11,1	292,9
4	N_{60} P_{90} K_{60}	345,1	310,2	10,2	304,0
5	N_{90} P_{90} K_{60}	342,6	306,3	10,6	299,8
6	Nitragin (without fertilizer)	329,7	290,8	11,8	283,7
7	$P_{90}K_{60}$ + Nitragin	337,3	300,9	10,8	294,6
8	$N_{30}P_{90}K_{60}$ + Nitragin	345,8	312,6	9,6	304,8
9	$N_{60}P_{90}K_{60}$ + Nitragin	352,4	320,6	9,0	316,0
10	N_{90} P_{90} K_{60} + Nitragin	348,8	313,6	10,1	310,2

According to the data on grain yield of winter wheat, the highest rate was observed in options 8, 9, planted with winter wheat on the background of N_{30} P_{90} K_{60} and N_{60} P_{90} K_{60} kg / ha of mineral fertilizers treated with nitragin before sowing soybean seeds grown as a secondary crop, 56.6-58.4 centner / ha, winter wheat was sown on the background of N_{30} P_{90} K_{60} and N_{60} P_{90} K_{60} kg / ha norms of mineral fertilizers without nitrogen treatment before sowing of soybean seeds as a repeat crop. in the 3, 4-options it was 54.5-56.7 centner / ha. Before sowing the seeds of soybeans grown as a secondary crop, 48.2 ts / ha of grain was obtained from the 1st variant of winter wheat cultivated against the background of untreated nitragin and mineral fertilizers.

Conclusion

Based on perennial research, we can conclude the following:

- If winter wheat is grown continuously for 11 years in a field, adding 20 tons per hectare to a lesser good, the fight against infertility against the soil is 33.1%, and the total nitrogen depletion is 52.8%. N_{200} P_{140} K_{100} kg/ha sound shower on mines by 31.5%, by 50.0% in total, by 41.5% against beautiful drugs when lost in general, by 63.9% of voting in general decreased.
- When winter wheat is sown in one field for 11 consecutive years and 20 tons of manure per hectare is applied for its cultivation, the grain yield is 35.3 centner/ ha compared to the yield obtained in the first year, 36.3 centner / ha with mineral fertilizers N_{200} P_{140} K_{100} kg / ha, N_{150} P_{105} K_{75} kg / ha causes a loss of yield at a rate of 32.0 centner / ha when applied in moderation, and 37.0 centner / ha when not fertilized at all.
- When winter wheat is sown for many years after a 3-year alfalfa, its grain yield is higher in the first three years after alfalfa, regardless of the type and amount of fertilizer, and in subsequent years the grain yield decreases sharply.
- Application of 15 t / ha of organo-mineral compost in addition to the norm of mineral fertilizers N_{180} P_{125} K_{90} kg / ha in winter wheat ensures an additional grain yield of 14.6 centner / ha compared to the variant of mineral fertilizers and increases the protein content of the grain by 0.8%. served to be.
- In winter wheat, half-rotted black cattle manure and compost were applied from 10 to 20 tons per hectare under autumn plowing, and the application of mineral fertilizers at the rate of N_{200} P_{140} K_{100} kg / ha provided an additional grain yield of 6.9-11.4 centner / ha compared to the control option.
- Before sowing the seeds of soybeans grown as a secondary crop were treated with nitragin, on the background of mineral fertilizers N_{30} P_{90} K_{60} and N_{60} P_{90} K_{60} kg / ha provided that the yield was 2-5% higher than the control option.

References

1. Abdurakhimov ShO. Irrigation procedures for winter wheat and the effectiveness of mineral fertilizers in the conditions of meadow soils of Fergana region." Dissertation for the degree of Candidate of Agricultural Sciences. Tashkent, 2006, 155 p.
2. Atabaeva KhN, Khudaykulov JB. "Botany". “Science and Technology Publishing House”. Tashkent, 2018, 321 p.
3. Atoev BK, Makhammadiev SK. “Impact of winter wheat varieties and fertilizers on soil nutrition” // Republican scientific collection “Prospects for the development of cotton growing in Uzbekistan”. O'zPITI. Tashkent, 2014, P. 20-23.
4. Bozorov X. "Improvement of agronomic measures for the cultivation of high grain yields from winter wheat in the conditions of grazing gray soils of Jizzakh region" //agriculture PhD dissertation abstract. PSUEAITI. Tashkent, 2018, P. 20.

5. Boltaev SA, Ochildiev NN, Normatov A. Proceedings of the International Scientific-Practical Conference "Effects of organomineral composts based on bentonite on the agophysical properties of the soil" // "Current trends in the selection, seed and agrotechnology of field crops." PSUEAITI. Tashkent, 2016, P 27-29.
6. Davlatyarov MKh, Achilov UA. " The effect of mineral fertilizers on winter wheat crops". Achievements of agrarian science. Tashkent, 2002, P. 50-52.
7. Methods of conducting field experiments – Tashkent, 2007, 180 p.
8. Armor BA. Methodology of field experience. M.: Agropromizdat, 1985, 255 p.
9. Ибрагимов Н, Мирзаев Л. "Жанубий Қорақалпоғистонда минерал ўғитларнинг кузги буғдой дон ҳосилига таъсири" // "Қишлоқ хўжалиги экинлари селекцияси ва уруғчилиги соҳасининг ҳозирги ҳолати ва ривожланиш истиқболлари" мавзусидаги Республика илмий-амалий анжумани илмий материаллари" ПСУЕАИТИ. 2-қисм. Тошкент, 2015, Б 312-315.
10. Ibragimov NM, Khakimov ShZ, Mirzaev LA. "Impact of mineral fertilizer norms on the absorption of winter wheat NPK and surface biomass" // Collection of articles based on the reports of the international scientific-practical conference "Scientific and practical bases of increasing soil fertility". O'zPITI. Tashkent,2007, P 234-236.
11. Ishmukhammedova R. Dependence of the efficiency of cultivation of winter wheat sort "Chillaki" on the timing of sowing and the combination of feeding // Agro ilm. –Tashkent. 2008; 4(8):22.
12. Methods of agrochemical analysis of soils and plants. - Tashkent, Mekhnat, 1977, 228 p.
13. Mekhmonov Sh. Dependence of yield of wheat variety "Kupava" on norms and ratios of mineral fertilizers // Agro ilm. –Tashkent. 2007; (2):20.
14. Muminov KM, Qodirova ShE. "Optimization of water-nutrient regime of winter wheat in weakly saline meadow-gray soils" // Collection of articles based on the reports of the international scientific-practical conference "Water and resource-saving agrotechnologies in agriculture of the Republic of Uzbekistan". O'zPITI. Tashkent, 2008, P 246-248.
15. Satipov G, Bobojonova S. "The impact of mineral fertilizers on the yield and quality of winter wheat varieties" // Collection of reports of the Republican scientific-practical conference "Introduction of new energy-saving agro-technologies in agriculture." O'zPITI. Tashkent, 2011, P. 190-192.
16. Siddiqov R. "Scientific and practical bases of improving the technology of cultivation of winter wheat on irrigated lands" // Ph.D. diss Abstract. Tashkent, 2007, 28 p.
17. Toshkhujaev T. The role of local and mineral fertilizers in grain production // Agro ilm. –Tashkent, 2007; (2):22.
18. Khoshimov F, Ortiqov T, Boboeva N. The effect of mineral and organic fertilizers on the agrochemical properties of saline soils with magnesium carbonate and the yield of winter wheat // Agro ilm –Tashkent. 2011; 1(17):19.
19. Ernazarov Sh. Spring and autumn wheat // Agriculture of Uzbekistan. –Tashkent. 2005; (7):17.
20. Ernazarov I. Does productivity depend on nutrition? // Agriculture of Uzbekistan. –Tashkent. 2010; (4):5.