On The Issue of Growing Agricultural Crops

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Abstract

In the article, the problems related to improving soil productivity by the step-by-step implementation of the recommendations of research and experiments on the radical reformation of the soil condition, which is the cheapest and only effective solution that allows saving the soil from a difficult situation, were highlighted. To achieve the goal, agrophysical studies, agrochemical studies, biometric observations and measurements, biometric observations and measurements were carried out. Based on the results obtained, recommendations were proposed to improve the condition of the soil.

KeyWords: Agriculture, soil, humus, fertilizers, phosphorus, reclamation, processing, field experience, laser processing, productivity, soil fertility, fertility, laboratory studies, experimental studies

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Introduction

In foreign countries, 40-50 years ago, they realized that the soils are in poor ecological condition, and the bonitet and fertility of the soils are decreasing. Realizing that the unintended use of synthetic chemicals for soil conditions would have severe consequences, they took steps to radically improve the situation. In many countries, the norms of synthetic mineral fertilizers and pesticides have been sharply reduced. They even completely abandoned synthetic fertilizers, especially pesticides, when growing agricultural products and introduced "biological farming". It should be noted that over the past 70 years, the highest standards of mineral fertilizers and pesticides on earth have been applied in our republic. We believe that this is only one way to ensure the sustainable development of cotton growing and agriculture in general.

Until now, no one has thought about completely returning what was brought from the earth, maximizing soil fertility, and then increasing this figure year after year. This is extremely difficult, but today it is the cheapest and only effective solution that allows you to save the soil from a difficult situation. It is possible to radically reform soil fertility by gradually improving the soil through the step-by-step implementation of recommendations. Various recommendations and decisions that will be taken on this issue should be aimed at preserving and increasing soil fertility in organic farming.

Materials And Methods

2.1. Methods for conducting laboratory experiments

Agrophysical research

The "Methodology of Agrophysical Research" manual was used to conduct agrophysical analyzes of the soil during experimental research [1]. To determine the volumetric mass of soil, soil samples were taken from 0-10, 10-20, 20-30, 30-40, 40-50 cm soil layers before sowing and at the end of the application period, in each of the three variants of the experiment, a cylinder (500 cm3 in volume) was used). Porosity was determined by weighing on a balance according to the method of N.A. Kachinsky, as well as based on units of volume, mass and specific gravity [2].Samples according to S.N. Ryzhov were taken cylindrical in size 3x3 m [3]. Soil samples were filled with water by 20 cm, and dried in a special thermostat for 6 hours using a special device, and the limiting field moisture capacity of the soil was determined by weighing.

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With the help of cylinders, the water permeability of the soil was determined at the beginning and end of the operation period at points determined by the method of P. Dolgov [4]. During the period of operation, the pre-irrigation soil moisture was controlled and determined by thermostatic scales and irrigation in comparison with the irrigation regime and maximum permissible parameters. Irrigation rates were measured with Chippoletti water meters 0.5 m wide (sewerage 0.25 m wide).

Agrochemical research

The manual "Methods of agrochemical analysis of soil and plants" was used for the agrochemical analysis of soil [1]. At the beginning and end of the period of application of all crops studied in the experiment, soil samples were taken from the 0-30 and 30-50 cm soil layers, and the amount of humus was determined by the method of I.V. Tyurin. The total amount of nitrogen and phosphorus was determined by the method of A.P. Gritsenko, I.M. Maltsev, the amount of nitrate nitrogen by the method of Grunwald-Lage, mobile phosphorus by the method of B.P. Machigin, and the exchange potassium flame photometer by the method of P.V. Protasov [5,6,7,8,9,10].

Biometric observations and measurements.

Based on the goals and objectives of the experiments, phenological observations and calculations were carried out in the following order. On the 9th, 12th and 15th days of sowing, calculated plots 16.7 m long were separated using wooden pegs and cords and the field fertility of the crop was determined. With the help of wooden pegs and paper labels, 50 plants were identified on experimental variants and returns, and on the first day of June, July, August, and September - the height of the main stem, the amount of turf, the number of crop elements, all the necessary sowing parameters were determined and taken into account. The leaf surface of cotton was determined by the method of A. Nichiporovich in 5 plant samples from 3 points of each variant [8–11].

2.2. Agrotechnical activities carried out in the experimental field

Ploughing, preparing for planting crops, fertilizing, watering, inter-row spacing and other agrotechnical activities are carried out in a timely and high-quality manner based on scientific recommendations when cultivating crops, the plant passes from one phase to another with normal and timely development. In the experimental field, agrotechnical measures were carried out based on general agrotechnical measures adopted on the farm. Agrotechnical activities carried out in the experimental field were organized based on scientific recommendations developed by the Scientific Research Institute of Cotton Growing of the Republic of Uzbekistan, taking into account the conditions specified in the guidelines (Table 1).

Table 1. Agrotechnical activities carried out in the experimental field and the timing of their implementation

№	Work performed agrotechnical measures	The date
1	Land cultivation	20.11.2020
2	Current alignment	31.03
3	Basic fertilization	1.04
4	Chiselling, harrowing, mulching	1.04
5	Sowing seeds	6.04
6	Weeding	4.05
7	1-cultivation	2.05
	2-cultivation	21.05
	3-cultivation	8.06
	4-cultivation	27.07
	5-cultivation	3.08
8	Clearing the field from weeds	7.05
	1-processing	
	2- processing	5.06
9	Chemical Warfare (Field Shores Treated with Jesus Liquid)	20.05

10	Irrigation	
	1- Irrigation	16.05
	2- Irrigation	1.06
	3- Irrigation	21.06
	4- Irrigation	28.07
11	Deep processing	25.04
12	Pest control	30.05
	1- Biological warfare	
	2- Biological warfare	14.06
	3- Biological warfare	
13	Harvesting	
	1-assembly	
	2-assembly	

Classification of crops planted in the experimental field. General classification of the alfalfa variety Tashkent-1 at the Research Institute of Cotton Growing and Seed Growing, created from the local Markhamat alfalfa, the variety is high-yielding, mid-season, frost-resistant, harvested 4-5 times per season, can produce 810 tons of green mass per hectare, up to 250 tons of hay. Leaves yield 39-45%. The amount of protein in the plant is 16.3-18.7%. This variety is recommended for planting in Fergana, Andijan, Jizzakh, Navoi, Namangan, Samarkand, Surkhandarya, Syrdarya and Tashkent regions.

Experimental Part

The soil-climatic conditions of the Fergana region are characterized by a higher level of soil salinity than in other regions; plant and root residues remaining in the soil have a positive effect on the accumulation of organic matter in the soil.

The data obtained on the number of roots and root residues of plants in the soil after sowing alfalfa in a field of winter wheat are presented. Proper crop rotation is one of the main conditions for a high level of agriculture, the main task of which is to meet the needs of the population for food, as well as maintain soil fertility, effective control of weeds, agricultural pests and diseases in crop yields.

Take a look at these examples, which illustrate how the effectiveness of mineral fertilizers is reduced. Currently, the efficiency of nitrogen in agriculture is only 30-40 per cent instead of 50-70. In other words, 60-70% of nitrogen fertilizers applied to cotton fields are not consumed by cotton. This excess nitrogen poses an extremely serious threat to the environment. Especially in areas where groundwater is shallow, most of it degrades along with groundwater, drainage and collector water. A large amount of nitrate nitrogen is added to the collector water, especially from cotton and wheat fields, which causes damage to the entire organism [11,12,13,14].

Based on the generalization of the results of field experiments conducted in various soil and agrotechnical conditions, it is possible to determine the average optimal level of nitrogen for the republic. On average, 140-150 kg of nitrogen per hectare of planned areas can be considered 30-35 q/ha. Nitrogen fertilizers application in a stratified way. It should be borne in mind that in areas with a nitrogen content of more than 300 kg per hectare in a 1-meter soil layer, it is possible to obtain high yields of cotton, wheat and other crops without the use of nitrogen fertilizers at all.

On soils with a nitrogen content of up to 300 kg, yields can be increased by halving the annual nitrogen rate. In soils with reserves of nitrate nitrogen up to 150 kg, the established norm should be observed. On this basis, having an agrochemical cartogram of the amount of residual nitrogen in the soil, and having determined the need for nitrogen in the soil of cotton, the above rate of 140 kg can be significantly reduced.

It is well known that the restoration and increase of soil fertility can be achieved only at the expense of organic matter. Due to the limited availability of organic fertilizers, and manure resources (1.5 tons per 1 ha of arable land), alfalfa plantings are the main source of soil replenishment with organic matter. Repeatedly after winter wheat, crops such as soybeans, lupins, ground nuts, rye, and peas increase soil fertility. Leaves up to 5-15 tons of root residues in the soil per year. Leaves 100-120 kg of pure nitrogen in the soil.

Results And Discussion

From year to year, the culture of growing wheat, which is the main food crop in our country, is being improved, and breeding work is being improved, aimed at creating new high-yielding varieties of wheat adapted to the difficult natural and climatic conditions of the republic, agricultural technologies are being improved, most importantly, the attitude of people to the land.

The possibility of replacing the local fertilizing of the soil ("manure") and the planting of the "Alfalfa" crop, which in agriculture has always been an economical and effective way to maintain and increase soil fertility, was initially limited, and later completely lost. As a result, the taste and quality of foods grown today are deteriorating. In the same way, in our time, when the population of the Earth and our country is constantly growing, feeding and providing them with food is the main problem of the world community, and scientists will have to find a solution.

In other parts of the world, negative natural conditions leading to the reduction of arable land are extreme heat, a sharp increase in temperature, drought and vice versa (severe floods, rains, hail), wind, weeds, insects and pests from 30-40%, the output of cultivated agricultural production is declining to some extent. Providing the population with nutritious, protein-rich, environmentally friendly food has always been and remains relevant.

Numerous theoretical and practical experiments have been carried out to compensate for the loss of food products, especially wheat grain, due to the above disadvantages. However, to date, the use of wheat grains, which are naturally thrown out from the ears of winter wheat, has not been studied in detail, as well as in what cases the grain spills into the furrow and the reasons for this [12-16].

1. It is known that the germination of seeds (grains) of wheat goes through the main stages of development, such as germination, accumulation, harvest, germination, flowering and ripening, during the application period until new grains emerge from seedlings. Full ripening of wheat grains occurs only after the processes of milky, waxy maturation. In addition, there are small intermediate phases between phases that combine each of the main phases with each other, and nutrients and moisture must be provided in moderation. For example, from the phase of accumulation to the phase of extension, there are small intermediate phases associated with the formation of joints of the first, second, third, fourth, fifth and sixth stems. It fills the intermediate phase with water and nutrients. It is known that the gradual duration of the development phases depends on the biological forms and properties of wheat, soil and climatic conditions, and the regulation of sunlight and moisture in the germination and flowering phase plays a key role in determining the yield of wheat grain.

2. As mentioned above, to ensure that the grown grain is harvested without loss, a series of preparations for harvesting, the elimination of diseases and pests in the fields, and weed infestation to determine the condition of wheat during the milk fermentation period has been revised.

3. In order to avoid crushing the grain, and spilling the grain from the ears, prepare roads, field edges, and irrigation canals, where equipment is mainly used to level so that the combines can move smoothly. Wheat stalks are prepared by mowing on reversible platforms, which are returned by harvesters from below, to a width of 10-11 meters.

4. Irrigation of wheat fields is carried out a week before harvesting to prevent drying of wheat grain spills, and drying of wheat ears from hot heat to ensure the safety of the grain harvest in grain and ensure high-quality grain passage.

5. If the grain is not harvested by combines within three weeks after physiological full ripening, the yield of wheat in the fields will decrease day by day due to the drying out of the grain. Therefore, it is necessary to ensure timely harvesting without destroying the crop.

6. Before harvesting wheat, the height of the combines and cutting knives is checked, taking into account the height of the plant, and special handles are sealed under the harvesting equipment so that the grain does not spill out onto the ground during harvesting.

7. The fact that wheat that has passed the full ripening phase remains on the stalk without being harvested in time, firstly, causes the grain to spill out of the ears, and secondly, too much drying, both the quality and taste of flour and bread from such overdried grains is low.

8. In areas where there is a lot of wind, it is necessary to start harvesting grain from the sown areas early to prevent grain from spilling on the ears.

9. During the ripening period of wheat, late May or early June, water, wind-blown weed seeds, reeds, gum, as well as wild lupine, ryegrass, ituzum (Solanum) and other weeds grow rapidly and

reduce the productivity of photosynthesis, which negatively affects the quality. Also, during the harvesting period, these weeds wrap themselves in the working bodies of combines or wheat, breaking the ears and throwing the grain out of the ears into the garden.

Despite the above recommendations, waste is allowed in winter wheat sown over large areas of the country.

To clarify the natural shedding of grain, the amount of crumbled grain from the ears was counted in the field of winter wheat, sown on an experimental farm on an area of 39 hectares. For this, a total of 180 samples were taken from 39 hectares of winter wheat crops using a counter with an area of 1 m2 using the envelope method with a length of 16.6 m each.

The results were rounded by the number of wheat grains 10, 13, 17, 22, 16, 33, 49, 63, for example, 22 grains per 1 m2 out of 17 spilt 17 × 22 = 374:22 = 17 in the case of an average spilt grain, table 2 was compiled.

In order to clarify the nature of the spoilage and loss of grain, ZarkentOinurSakhovati in the Tashlak district of the Ferghana region, Davr in wheat, Zamin in Zarzamin 2020, Asr in AzamjonDalaZinati, "Zamin" in the Altyarik district, "Alekseevich" in the farm "OltiarikTashkhirmonabad", "Yaksart" in the farm "Nozimakhon-Makhmura", "Alekseevich" in the farm "GofurjonNurliKelajak", "Thunder" in the farm "Anvarrais" of the Besharyk district, in the farm "ChilmatRais" we carried out observations on areas sown with varieties Aleseevich (Table 2).

Table 2. Loss of wheat yield due to the amount of natural spillage of grains in the husk of winter wheat (area 1 m2)

№	Name of the farm	Wheat variety	Weight of 1000 grains, gr		Average lost wheat grain yield				
			Description of the variety	In the field	The number of samples taken to determine the scattered grain per 1 m2 of area	The average number of spilled grains per 1 m2 from 30 samples	Gr per 1 m2 of area	kg per hectare	kg per 1000 ha
Tashlak region									
1	“ZarkentOinursakhovati”	Davr	41-43	42	30	49	2,058	20,58	20580
2	“Zarzamin-2020”	Zamin	39-42	42	30	63	2,646	26,46	26460
3	“Azamjondalazinati”	Asr	46-48	42	30	26	1,092	10,92	10920
Altyaryk district									
4	“OltiariqNurliKelajak”	Zamin	39-42	42	30	42	1,792	18,04	18040
5	“OltiarikToshkhirmon rim”	Alekseevich	42-45	42	30	17	0,714	7,14	7100
6	“Nozimahon-Makhmura”	Yaksart	40-42	42	30	22	0,924	9,24	9240
7	“GofurjonNurliKelajak”	Alekseevich	42-45	42	30	13	0,546	5,46	5460
Besharyk district									
8	“Anvarrais”	Grom	38-41	38	30	33	1,254	13,86	13860

9	"Chilmatrais"	Alekseevich	42-45	42	30	31	1,2-50	12,60	86,0

Conclusion

In our observations, the area of 1 m2 of harvested wheat was determined by the number of wheat grains spilt into the bed for the above reasons. The wheat variety was divided into 30 samples, each of which was planted in an envelope with a total of 30 samples. However, we were unable to determine the cause of the spill.

When analyzing the average number of grains per 1 m2 of wheat of the Zamin variety in two different regions, it was noticed that 63 grains were spilt in the Tashlak region in grams 2646 g, and in the Altiaryk region 42 grains, 1792. It is also interesting to note that among the wheat varieties, the Zamin variety has a higher grain yield than other wheat varieties. In the conditions of the Altyaryk region, since the wheat variety Alekseevich was the same variety, the amount of scattered wheat per 1 m2 was 17 grains or 0.714 g in the Farm Enterprise (FH) "Tashkhiromonobad" and 13 grains or 0.546 g in the FH "GafurjonNurliKelajak". It can be seen from the data in the table that when we took an average of 30 samples per 1 m2 of the area and analyzed them for each variety, the average value was 26.46 kg/ha per hectare, 260 kg per ten hectares, 2600 kg per 100 hectares, 1000 per 1 m2. Used 26,460 kg of wheat per hectare.

It is interesting that when weighing in the laboratory the weight of 1000 grains of wheat poured into the field, it turned out that in all varieties of wheat there were at least 42 grams.

Thus, in one area, 100,000 ha of wheat were sown and 33 grains or 1,254 g per 1 m2 were sown, and 13.83 kg per 1 ha and an average of 1,383,000 kg of wheat per 100,000 ha were lost.

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Conflicts of Interest

The authors report no conflicts of interest.

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