

Influence Of Repeated Sowing On Agrophysical Soil Properties, Water Permeability And Yield Of Winter Wheat

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Abstract – In the new farming system, due to the short crop rotation in the cotton + grain crop rotation, green manures can be introduced, its positive effect on soil fertility increases, positive results are achieved as a result of harmonization of physical, chemical, biological properties of soil, which leads to an increase in yield and quality of winter wheat by 15-20%.

Keywords – Repeated Culture, Crop Rotation, Green Manure, Crop Quality, Soil Density, Porosity, Soil Water Permeability, Winter Wheat Yield.

I. INTRODUCTION

Improving soil fertility in agriculture is directly related to the norms and proportions of science-based mineral fertilizers, the use of organic fertilizers, the widespread use of crop rotation, the introduction of land and water saving and other advanced agricultural technologies. In more than one million irrigated areas of the country, cotton is planted alternately with autumn grain crops every year, but it is not enough to maintain and increase soil fertility [3; 27-p.].

One of the most pressing issues of our time is to increase crop yields based on the improvement of the farming system, which is aimed at maintaining and increasing soil fertility in the current crop rotation. One of the important factors in solving this problem is the planting and care of secondary crops in the fields vacated by wheat in the summer, and the expulsion of green mass grown at different times as green manure. As a result of this measure, the soil will be enriched with environmentally friendly, inexpensive, high-quality organic biomass. Biomass rot before next year's main crop will not only increase soil fertility, but also have a positive effect on crop yield and quality, prevent the spread of diseases and pests in the soil and increase the effectiveness of mineral fertilizers, prevent soil salinization and improve crop yields [4; 215-225-p., 5; 19-52-p.].

II. MATERIALS AND METHODS

The Bukhara-102 variety of medium fiber cotton was planted in the experiment. Field experiments were performed in 6 variants, 4 repetitions, in one tier, the area of each variant was 432 m². 1. Winter wheat (control) 2. Cotton. 3. Corn. 4. Peas. 5. Mash. 6. Rapeseed. Phenological observations, biometric measurements and yield determinations were conducted according to field experimentation methods [1; 145-p., 2; 356-p.] on delineated model plants in the area of 1 m² in each treatment and replication of the experiment.

In the experiment, measures were taken on the basis of agrotechnological maps used on the farm in the agro-technology of cotton cultivation on intermediate crops. Cotton was fed with mineral fertilizers at the rate of N200P140K100 kg per year during the entire growing season, watered 4-5 times.

III. RESULTS AND DISCUSSION

In the experimental field, which was carried out in the conditions of typical irrigated gray soils of Kashkadarya region, in the areas free of grain, from 10 to 20 July, repeated sowing and maintenance of crops was carried out. Before the time of sowing of winter wheat to harvest an average of 33.7 t / ha (for silage), peas -1.75 t / ha, mash -1.53 t / ha, rapeseed -27.0 t / ha (green mass) from siderate crops corn in 3 years achieved.

Once the cultivated masses are crushed and buried in the soil, they are mineralized during the decay process along with the root remains, which has a positive effect on soil properties.

When analyzing the effect of past crops on soil aggregates, pea, mash, rapeseed crops of past crops were 4.75-5.43% more resistant to control in the 0-30 cm layer at the end of the growing season and 5.42-5.64% in the 30-50 cm layer. The amount of aggregates increased. Similar indicators were observed in other variants, and in the control - on the contrary. This means that the plants studied in the experiment can have a positive effect on maintaining soil fertility.

In the experiment, the soil density was 1.33-1.34 g / cm³ after sowing of past crops, while the soil density after sowing of winter wheat varied depending on the type of past crops, that is, while past crops increased by 0.03–0.05 g / cm³ in winter wheat and cotton planted variants, soil density decreased by 0.01–0.04 g / cm³ in areas free of peas, mash and rapeseed compared to the initial amount.

In the field experiment, it was found that the porosity of the soil in the 0-30 cm layer was 50.2% in the control variant, while at the end of the growing season it decreased by 48.7%, i.e. 1.5%. After planting peas, mash, rapeseed in the previous crops, it was observed that the porosity of the soil increased by 0.6-1.9% compared to control.

In our experiments, when past crops were planted, the effect of soil on water permeability varied depending on the crop type, the water permeability of the soil in the variants planted with mash, peas, rapeseed as a past crop has changed for the better. Soil water permeability was highest in the mash and rapeseed plantations, where it was 648-664 m³ / ha during the growing season, and 584-604 m³ / ha after repeated crops (Table 1).

In the experiment, the average grain yield of winter wheat after repeated crops in the control variant was 4.97 t / ha, while the highest yields were 6.0-6.51 t / ha after repeated crops of peas, mash and rapeseed, 1.03 compared to the control. An additional grain yield of -1.54 t / ha was found (Table 2).

Table 1. Effect of soil permeability before and after sowing of repeated crops, m³ / ha

№	Options	Hours						All
		1	2	3	4	5	6	
		Reproductive crops during the growing season						
1.	Winter wheat (control)	200	114	74	55	46	44	533
2.	Cotton	225	142	92	62	53	50	624
3.	Corn	226	135	88	68	52	48	617
4.	Peas	227	140	87	68	54	50	626
5.	Mash	230	148	94	70	56	50	648
6.	Rapeseed	232	154	94	74	58	52	664
After repeated crops								
1.	Winter wheat (control)	135	92	71	46	44	42	430
2.	Cotton	174	125	87	63	50	48	547
3.	Corn	168	123	86	62	50	48	537
4.	Peas	176	126	88	66	52	50	558
5.	Mash	188	131	89	68	54	52	584
6.	Rapeseed	194	136	92	72	58	52	604

Table 2. Influence of repeated crops on soil fertility and winter wheat yield, t / ha

№	Вариантлар	2016 y	2017 y	2018 y	Average
1.	Winter wheat (control)	4.86	4.93	5.12	4.97
2.	Cotton	5.61	5.52	5.46	5.53
3.	Corn	5.36	5.17	5.40	5.31
4.	Peas	5.87	5.98	6.15	6.0
5.	Mash	6.05	6.21	6.43	6.23
6.	Rapeseed	6.02	6.37	7.14	6.51

In the experiment, the quality of grain also changed under the influence of repeated crops. Among the factors influencing the quality of grain, the viscosity was 54.6%, protein 12.1%, gluten 26.3% in the control variant, and these indicators were 62.5-60.4% after cotton and corn, protein 13.4-12.4%, gluten 26.9-26.5%. In the variants sown with winter wheat after the peas, these figures were 58.8%, 13.9% protein and 27.1% gluten, respectively. The highest rates in this regard were observed in the options planted with mash and rapeseed.

IV. CONCLUSIONS

In the conditions of typical gray soils of Kashkadarya region, sowing of peas, moss, rapeseed as a repeat crop in June-July will improve the agro-physical and water permeability properties of the soil, increase its productivity and create an opportunity to grow high-quality grain from winter wheat to 6.0-6.51 t / ha.

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