

**THE EFFECT OF SIDERATE CROPS AND MINERAL FERTILIZERS RATE ON SOIL WATER PERMEABILITY**

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E-mail: [1980\\_ganiyev@mail.ru](mailto:1980_ganiyev@mail.ru)**ABSTRACT:**

In the experiment, the water-physical properties of the soil were improved due to the use of manure and mineral fertilizers on the background of siderate crops and the application of manure and mineral fertilizers in the conditions of moderately saline sierozem soils of the Jizzakh region N-160, P2O5-112, K2O-80 kg/ha and in addition 20 t/ha of manure under the plow, the best result was obtained in option 7. At the end of the application period, the water permeability of the soil is 6 hours, it was 887 m<sup>3</sup> /ha.. This is more than 108 m<sup>3</sup> /ha compared to the control. Therefore, in the conditions of medium salinity soils, water passage in this norm improves the salt balance and creates favorable conditions for plant growth and development.

**Keywords:** average salinity, being meadow sierozem soils, water permeability, siderate crops, manure, mineral fertilizers, rate, ratio.

**Introduction**

It is known that the water permeability properties of the soil depend on the type of soil, mechanical composition, volume weight. Changes in water permeability of the soil in the conditions of irrigated agriculture depend on various factors, and as a result of the applied agrotechnical measures, measures to increase the soil properties and the productivity of agricultural crops are being improved under the conditions of production.

According to the data of B.M. Khalikov [1], in the 2:1 system of short-row rotation, only winter wheat, repeated and intermediate crops account for a total of 12.43-16.80 tons per hectare, in the 1:1:1 system 12.09 It was determined that 16.09 tons of roots and roots will be left. As a result of the rotting and disintegration of some of these residues in the soil, the volume mass of the soil in the tillage and sub-tillage layers of typical gray, barren and meadow-alluvial soils is reduced by 0.02-0.04 g/cm<sup>3</sup>, the amount of water-resistant aggregates is by 2.4-3,7%, and soil water permeability is 2.1-14.3%, respectively, according to soil types; 2.5-3.0%; It was observed that it increased by 6.5-14.2%.



E.B.Boyniyozov [2], in the conditions of the meadow-barren soils of Surkhondarya, the highest yield of blue mass was observed when water grass was planted mixed with amaranth, and it was 1281.9 centners per hectare. The author notes that nutritious crops are not only nutritious fodder for livestock, but also improve the agrophysical and agrochemical properties of the soil. It increases the yield of cotton planted after it by 3-4 c/ha.

Also, the agrotechnical activities, which have recorded high results in a number of scientific researches, complement each other in the widespread introduction of advanced technologies today. Enriching the set of agrotechnical measures with new developments in terms of improving soil properties and increasing crop productivity is always a demand of the times.

### RESEARCH METHODS

In our experiments, it is intended to determine the effect of applying 10 and 20 t/ha of manure in addition to different ratios and norms of mineral fertilizers and plowing under the plow with a two-component mixture of rapeseed and perco as a siderate crop in a farming system where cotton is cared for after cotton was caught.

Experiments were conducted in Mirzachul district during 2015-2018 in field conditions. The soil of the experimental field is a sierozem soil that is becoming grassy, the mechanical composition is medium loam, the seepage water is located at a depth of 1.5-2.0 meters, and it is moderately saline.

The experiment was carried out in 3 fields (in time and space) and included 13 options. Placed in 4 iterations and variants in 1 tier. The cotton variety "AN-Bayovut-2" was planted in the experiment. Placement of options in experiments, phenological observations and calculations, study of the influence of studied factors on soil agrophysical factors, in particular, water permeability, "Method of field experiments" [3], "Methodology of State Variety Testing of Agricultural Crops" [4], "Methods of Agrophysical Research" [5], It was carried out on the basis of methodological manuals such as "Methods of conducting field experiments" [6].

### RESULTS AND DISCUSSION

The fact that the influence of the factors studied in the research, the data obtained in the first years, finds its confirmation in the following years means the importance of the results.

According to the received data, (2018) in the spring of the 2<sup>nd</sup> option, in the spring of the 2<sup>nd</sup> option, the high N-240, P<sub>2</sub>O<sub>5</sub>-168, K<sub>2</sub>O-120 kg/ha norm of mineral fertilizers in the ratio of 1:0.7:0.5 was applied at the end of the period of operation) water permeability of the soil was 276, 193, 117, 83, 71, 60 m<sup>3</sup>/ha in proportion to the observation hours, 800 m<sup>3</sup>/ha for a total of 6 hours. According to these results, it was observed that the water permeability properties of the soil decreased from the 1<sup>st</sup> hour to the 6<sup>th</sup> hour, which indicates that the density of the soil increased under the influence of water. In cotton, the rate of mineral fertilizers N-200, P<sub>2</sub>O<sub>5</sub>-140, K<sub>2</sub>O-100 kg/ha was applied in the 3<sup>rd</sup> option, and the water permeability of the soil was 265, 205, 123, 84, 76 and 66 m<sup>3</sup>/ha, and in 6 hours it was 819 m<sup>3</sup>/ha in total, and it was found that it decreased to 85 m<sup>3</sup>/ha in spring compared to the beginning of the period of operation. At the beginning of the operation period, 326 m<sup>3</sup>/ha



of water passed in the 1<sup>st</sup> hour , and during the 6<sup>th</sup> hour, this indicator was equal to 904 m<sup>3</sup>/ha.

Therefore, it can be concluded that the volume mass of the soil is less and the porosity is higher at the beginning of the cotton growing period in the spring, and by the end of the growing season, both properties have deteriorated under the influence of cotton irrigation and other agrotechnical factors.

Relatively better results were obtained when 20 t/ha of manure was applied in addition to the norm of mineral fertilizers N-160, P<sub>2</sub>O<sub>5</sub>-112, K<sub>2</sub>O-80 kg/ha, and the water permeability was 887 m<sup>3</sup>/ha in total, which is 10 t/ha. it was 57 m<sup>3</sup>/ha more than option 6, where additional manure was applied. At the same time, in the 5<sup>th</sup> option, where siderates were used, the rate of mineral fertilizers is N-160, P<sub>2</sub>O<sub>5</sub>-112, K<sub>2</sub>O-80 kg/ha, this indicator is 861 m<sup>3</sup>/ha, compared to the 7<sup>th</sup> option, it is 26 m<sup>3</sup>/ha, the control is the in comparison 1<sup>st</sup> option, it was 82 m<sup>3</sup>/ha more, which shows that the use of siderates also showed acceptable indicators on the background of fertilizer norms.

In cotton, when mineral fertilizers are used in the ratio of 1:0.5:0.3, in addition to the norm of N-160, P<sub>2</sub>O<sub>5</sub>-80, K<sub>2</sub>O-48 kg/ha, 20 t/ha of manure was applied, in the 13<sup>th</sup> option, the total water passed in 6 hours at the end of the operation period it was found that the amount was 853 m<sup>3</sup>/ha, which decreased by 51 m<sup>3</sup>/ha from the indicator at the beginning of the period of operation.

However, this indicator, in turn, is 63 and 55 m<sup>3</sup>/ha more, respectively, compared to the options using the N-240, P<sub>2</sub>O<sub>5</sub>-120, K<sub>2</sub>O-72 kg/ha and N-200, P<sub>2</sub>O<sub>5</sub>-100, K<sub>2</sub>O-60 kg/ha norms, which are carried out in parallel happened, although the same pattern was observed in high ratios.

Relatively acceptable indicators are the norm of mineral fertilizers N-160, P<sub>2</sub>O<sub>5</sub>-80, K<sub>2</sub>O-480 kg/ha in the ratio of 1:0.5:0.3 in cotton and in the option where rapeseed and perco crops are used as siderates as additional intermediate crops (var. 11) was also observed, and at the end of the praxis period, the water permeability of the soil was 835 m<sup>3</sup>/ha, which was 18 m<sup>3</sup>/ha less compared to the 13<sup>th</sup> option.

It should be noted that the effect of using siderates along with 10 and 20 t/ha of manure on the water permeability properties of the soil was relatively better. In cotton, 806 m<sup>3</sup>/ha of water was absorbed in 6 hours in the 4<sup>th</sup> option, in which N-160, P<sub>2</sub>O<sub>5</sub>-112, K<sub>2</sub>O-80 kg/ha were applied in the ratio of 1:0.7:0.5, compared to 98 m<sup>3</sup>/ha in spring compared to the beginning of the application period. it was found that it decreased, but it was 32 m<sup>3</sup>/ha more compared to option 10, where mineral fertilizers were used in the ratio of 1:0.5:0.3 N-160, P<sub>2</sub>O<sub>5</sub>-80, K<sub>2</sub>O-48 kg/ha. Such differences between variants in terms of soil water permeability were also reflected in cotton growth, development and yield.

The use of mineral fertilizers in cotton (1:0.7:0.5 ratio) in the ratio of N-200, P<sub>2</sub>O<sub>5</sub>-140, K<sub>2</sub>O-100 kg/ha and N-240, P<sub>2</sub>O<sub>5</sub>-168, K<sub>2</sub>O-120 kg/ha increases the water permeability of the soil. it was found that it decreased by 104 and 85 m<sup>3</sup>/ha, respectively, from the indicators at the beginning of the praxis period, and the control was 10-20 m<sup>3</sup>/ha more than the 1<sup>st</sup> option. However, these indicators are almost equal to the indicators of options (8-9) in the ratio of 1:0.5:0.3, and differed only by 10.0-21.0 m<sup>3</sup>/. So, in some cases, it was observed



that the applied manure and the crops planted in siderate had close effects on the water permeability of the soil. The obtained data are presented in Table 1.

**Table 1 Water permeability of the soil of the experimental field, m<sup>3</sup>/ha (2018)**

No	Fertilizer rates used in cotton, kg/ha			The ratio of mineral fertilizers, N: P: K	Manure, t/ha	Hours							
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O			1	2	3	4	5	6	total	
						At the beginning of the praxis period							At the end of the praxis period
						326	198	145	86	81	68	904	
1	Control (no fertilizer)			-	-	255	197	124	73	71	59	779	
2	240	168	120	1:0.7:0.5		276	193	117	83	71	60	800	
3	200	140	100	1:0.7:0.5		265	205	123	84	76	66	819	
4	160	112	80	1:0.7:0.5		266	203	127	76	71	63	806	
5	160	112	80	1:0.7:0.5	siderate	307	198	142	76	72	66	861	
6	160	112	80	1:0.7:0.5	10	302	188	132	71	72	65	830	
7	160	112	80	1:0.7:0.5	20	307	206	144	86	77	67	887	
8	240	120	72	1:0.5:0.3		285	181	127	76	66	55	790	
9	200	100	60	1:0.5:0.3		285	191	126	75	65	56	798	
10	160	80	48	1:0.5:0.3		262	186	123	76	69	58	774	
11	160	80	48	1:0.5:0.3	siderate	273	203	132	83	77	67	835	
12	160	80	48	1:0.5:0.3	10	305	201	131	74	64	55	830	
13	160	80	48	1:0.5:0.3	20	283	204	133	87	78	68	853	

Among the options in which different proportions and norms of mineral fertilizers were used in the experiments and the use of manure and siderates as an addition to them, the most acceptable indicators were mineral fertilizers in the ratio of 1:0.7:0.5 to the norms of N-160, P<sub>2</sub>O<sub>5</sub>-112, K<sub>2</sub>O-80 kg/ha, additionally obtained from option 7, where 20 t/ha of manure was applied under the plow. At the end of the application period, the water permeability of the soil was 307, 206, 144, 86, 77, 67 m<sup>3</sup>/ha in proportion to the observation hours, 887 m<sup>3</sup>/ha in a total of 6 hours, compared to the control, 88 m<sup>3</sup>/ha, 1:0, 34 m<sup>3</sup>/ha compared to the norm of mineral fertilizers N-160, P<sub>2</sub>O<sub>5</sub>-80, K<sub>2</sub>O-480 kg/ha in the ratio of 5:0.3 and additional 20 t/ha of manure, and 26 m<sup>3</sup>/ha compared to the option using siderates (5 options) was found to be high. Similar data were obtained in the 2016 and 2017 years of the study.

## CONCLUSION

From the data on water permeability of the soil, it can be concluded that in order to keep the water permeability properties of sierozem soils that are becoming grassy at a constant optimum in farms specializing in cotton cultivation, first of all, mineral fertilizers in the ratio of 1:0.7:0.5 applying the rate of /ha N-160, P<sub>2</sub>O<sub>5</sub>-112, K<sub>2</sub>O-80 kg should be applied to the cotton, and additionally, applying 20 t/ha of manure under the plow gives acceptable results.



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