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Influence Of New Types Of Horizontal Ditches On The Growth, Development And Yield Of Winter Wheat In Saline And Groundwater Surface Soils

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ABSTRACT

The average salinity of Jizzakh region in the vicinity of groundwater (1.5 m) under the influence of a newly built closed bed ditch, winter wheat is irrigated 3 times during the season, the current irrigation rate is 823-933 m³ / ha. The norm of seasonal irrigation was 2586 m³ / ha, and the grain yield of winter wheat was obtained depending on the experimental areas, ie the area of the new construction (experimental variant) and the old type of irrigated area (control). At the same time, the average grain yield in the experimental field was 43.2 t / ha, and in the control field - 40.1 t / ha.

KEYWORDS

Weakly saline, new construction, saline wash, drainage, ditch, moderately saline, shale, pipe, irrigation, water flow, wheat.

INTRODUCTION

It is known that one of the main factors in the production of abundant agricultural crops is to increase soil fertility and improve reclamation. In recent years, in order to

improve the reclamation of lands, the process of salinization is intensifying due to the lack of sufficient water to wash the soil saline in the autumn-winter period, the salinization process is intensifying as a result of insufficient repair

of ditches. This process, in turn, has a negative impact on soil fertility.

Work is underway to improve the reclamation of irrigated lands, increase the efficiency of water resources, improve the system of their accounting, as well as strengthen the material and technical base of water management organizations.

At the same time, the measures taken to reform agriculture and diversify agricultural production require further improvement of water management infrastructure based on the introduction of modern management methods in this area.

Further improvement of the system of water resources management and use of water facilities, ensuring the effectiveness of irrigation and land reclamation projects, introducing market principles and mechanisms in the field of water management, as well as the development of science in this area.

Due to low soil fertility in Jizzakh region, humus content of 0.8-0.9%, limited water resources, the area of saline lands is increasing.

Yields are also declining sharply in saline soils due to the inability to produce healthy and even seedlings under the influence of harmful salts. In such extreme conditions, it is necessary to increase the yield of cotton and wheat, efficient use of land and increase soil fertility.

According to scientific recommendations, in the soils of Jizzakh region it is necessary to use 2000-2500 cubic meters per hectare in low-salinity soils, 3500-4000 cubic meters per hectare in moderately saline soils, 5000-6000 cubic meters per hectare in strongly saline soils.

At a time when drainage and ditches are not working well, groundwater levels are rising year by year, and water scarcity is expected at high rates, saline washing can not only reduce salts but also secondary salinization of soils.

Therefore, in order to desalinate saline soils in Jizzakh region, to increase soil fertility, to develop scientifically based effective methods and acceptable standards of saline leaching suitable for the soil conditions of the region, taking into account the amount of harmful salts in the soil, water resources, depth of groundwater, local and to reduce the rate of fertilization by 45-50% through the effective use of mineral fertilizers in the current conditions of scarcity of saline soils,

At a time when water resources are in short supply, one of the urgent tasks is to save water, regulate all available water sources and develop water and energy-saving technologies to prevent it from being wasted and evaporated into the air.

In order to solve these problems, a new "new type of horizontal drainage pipes" was invented with the participation of experts and scientists. This device was tested in 1994 at the former Khorezm company farm in Arnasay district of Jizzakh region. The results showed that the salinity of the soil decreased, the agrophysical properties of the soil changed for the better, and productivity increased. Happiest of all, there has been no mud or sediment inside the pipes for several years.

The created new type of drainage pipes is made of plastic with a certain diameter, depending on the volume of groundwater, each piece is 10 meters long and 6.2 mm thick. The bottom measured areas of the pipe are drilled every 3-4 cm with a diameter of 2-3 mm. Its lower part is completely filled with fine sand and gravel, and a special pipe is laid.

Once the pipe is installed, the pipes are fastened together. Because these drainage pipes operate from bottom to top, under osmotic pressure, mud and sediment do not flow inside, which ensures that it will work for many years. These pipes can be placed at saline, groundwater collection and drainage areas, taking into account the outflow of water, depending on the size of the crop area at a depth of 1.5 to 2.5 meters. With the help of this new type of drainage pipes it will be possible to combat soil erosion, restore and increase soil fertility, improve its reclamation and restore ecological balance.

OBJECT OF RESEARCH

The research was conducted at Bakhmal Agro farm in Mirzachul district of Jizzakh region. : Meadow-gray soil, Century variety of wheat.

Development of ways to improve the reclamation of land, saline leaching and agro-technical measures appropriate to soil-climatic conditions to increase the yield of agricultural crops with moderate salinity and groundwater near the surface.

The purpose of the study: To study the effectiveness of new types of ditches and saline leaching methods and the impact on the growth, development and yield of wheat in areas of moderate and strongly saline groundwater near the surface of Jizzakh region.

RESEARCH METHODOLOGY

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In irrigated lands, groundwater is mainly generated by atmospheric precipitation, filtered water from irrigation networks, saline leaching, and water supplied for crop irrigation. Under the influence of these waters, the depth at which groundwater is located is constantly changing throughout the year. Sizot changes mainly due to changes in the water level due to physical binding from the soil surface and its use by plants for transpiration and drainage through ditches. (3)

In order to study the effect of the new design of the ditch system on the groundwater table, 3 observation wells were installed in the control area and 6 (5 m, 15 m, 35 m along the right and left sides of the ditch) in the experimental areas. The depth of installation of observation wells is 3 m, in which the depth

of groundwater is measured in January-November. (4)

In determining the water flow of a closed ditch in the experimental area, the mineralization level of the ditch water from the point of connection of the ditch to the collector was determined on the basis of ES d / cm once a month.

EXPERIMENTAL RESULTS

These scientific results show that the soil moisture in the autumn wheat experimental field was determined before sowing in autumn and during the growing season before each irrigation and on 1 m layer of soil. The results obtained are given in Table 1. According to this table, in the control variant of the experiment, the moisture content of the plowed (0-40 cm) layer of soil during the sowing of winter wheat was 10.2%, 11.4% in the experimental area, in the average 1 m layer, 14.0% of the same soil moisture was 64.5% relative to the LFMC (limited field moisture capacity).

Moisture in the surface layer of the soil cannot ensure the germination of winter wheat seeds. Therefore, irrigation was required to collect the seeds, and after the winter wheat was sown, it was irrigated at a rate of 823-865 m³ / ha to collect the seeds.

Winter wheat was required to be watered 2 times during the growing season. The first irrigation was carried out on April 22. Soil moisture before the first irrigation averaged 17.7% compared to (81.5% in LFMC) in the 1m layer and 17% compared to (78.3% in LFMC) in the experimental area. The reason for the relatively high soil moisture in the experimental areas in April is the effect of autumn irrigation and atmospheric precipitation in autumn, winter and spring.

In the experimental fields, the 2nd irrigation of winter wheat took place on May 13-15, and this was done during the flowering and ripening phase of winter wheat. This pre-irrigation soil moisture averaged 18.0% per 1 m layer in the control area compared to (82.9% in LFMC) and 16.0% compared to (76.5% in LFMC) in the experimental variant. In the control variant, the soil moisture is 0.7–2.0% lower than in the experimental variant, which is mainly due to the relative surface area of groundwater. The amount of water used for the 2nd irrigation of winter wheat was 912-933 m³ / ha.

Prior to the above-mentioned irrigations, soil moisture and irrigation norms ensured the normal growth, development and yield of winter wheat.

Table 1

**Soil moisture before irrigation of winter wheat in the experimental area.%
(2019-2020y)**

Soil layer sm	During the pre-irrigation period to get the seeds	During the period of growing	
		Before the 1 st watering	Before the 2nd watering
Control area			
0-20	8,2	14,1	13,8
20-40	12,3	15,8	14,9
40-60	14,1	16,9	17,3
60-80	16,8	19,5	20,5
80-100	18,9	22,5	23,6
average	<u>14,0</u>	<u>17,7</u>	<u>18,0</u>
0-100	64,5	81,5	82,9
Experimental area			
0-20	<u>10,8</u>	<u>14,8</u>	<u>14,4</u>
20-40	<u>12,0</u>	<u>16,2</u>	<u>15,6</u>
40-60	<u>16,0</u>	<u>16,3</u>	<u>16,4</u>

60-80	18,1	18,1	17,7
80-100	20,0	20,3	18,9
average	14,0	17,0	16,0
0-100	64,5	78,3	76,5

Note: The percentage of dry weight of soil Compared to LFMS, %

Table 2

**Norms and terms of irrigation of winter wheat in the experimental field, m³ /
ha. (2019-2020)**

Area	Watering for primary seed growing	In the period of growing			Seasonal watering norm
		1	2	3	
Control area	865 25.10.19	852 22.04.20	912 13.05.20	---	2629
Experimen tal area	823 27.10.19	830 23.04.20	933 15.05.20	---	2586

The order of soil salinity in the field of winter wheat.

Winter wheat was grown in the 2019-2020 season on the experimental field under the 2: 1 rotation system adopted in production. Prior

to sowing of winter wheat, soil samples up to 1 m depth were taken at 3 points from experimental and control options and dry residue and chlorine ion content were determined. The results of the soil analysis are given in Table 3.

The data in this table show that the soil of the experimental area was moderately saline at the beginning of the study in the 1 m layer (dry residue content was 0.691-0.727%, chlorine ion was 0.044-0.048).

The amount of water used for growing winter wheat (seasonal irrigation norm 2586-2629 m³ / ha) showed its effect on the salt regime of the soil.

The results of the analysis of soil samples taken at the end of the growing season of winter wheat showed that in both experimental areas, the amount of salts increased slightly compared to the state in the fall, ie during the sowing period. It was noted that relatively less salt was accumulated in the area where the ditch of the new design was present when the salinity status was compared across experimental areas. This situation depends on the depth of groundwater location, which in the control option is due to the fact that the groundwater level is relatively shallow and they are spent more on evaporation.

Growth, development and yield of winter wheat

Scientific observations on the growth and development of winter wheat in the experimental field were carried out during the growing season of winter wheat on the growth phases, ie in the stages of germination, flowering and ripening. (Table 3)

The data obtained showed that the stem length of winter wheat was higher in all growth phases in the experimental variant than in the control variant.

This figure is formed 26.3 cm in the control variant in the sprouting phase of winter wheat, 37.5 cm in the experimental variant, 68.0 cm in the sprouting phase, 71.8 cm in the

ripening phase, 77.8 cm and 81.3 cm in the ripening phase .

When studying the number of stalks of winter wheat, it was found that the total number of stalks in the experimental variant was 376.4 m² / piece, and in the control variant - 363.8 m², ie 126 m² / piece more. The same law was observed for productive stems. This figure was 337.4 m² / unit in the control variant and 346.8 units in the experimental variant.

The length of the grain, the number of grains per grain, the weight of the grain per grain and the weight of 1000 seeds were studied from the indicators of winter wheat grown in the experimental fields. The results of the above indicators are presented in Table 4. The data in this table show that the experimental area indices for all spike analyzes were found to be higher than the control area. It was observed that the length of the spike was 0.8 cm, the number of grains in the spike was 1.6, the weight of the grain in the spike was 0.11 g and the weight of 1000 seeds was 1.3 g more.

The grain yield of winter wheat grown in the experimental fields was determined at 4 points from each field at the end of the growing season, when the grain was fully mature. The data obtained are presented in Table 5.

The grain yield of winter wheat was also obtained depending on the experimental areas, in the area where the new structure was built (experimental variant) and the old type was fertilized (control). At the same time, the average grain yield in the experimental field was 43.2 t / ha, and in the control field - 40.1 t / ha.

In general, the study of winter wheat growth, development, spikes and grain yield in the experimental fields can be concluded that in

the experimental field during the growing season of winter wheat is controlled as a result of favorable ameliorative regime (relatively deep groundwater, reduced salt accumulation and optimal moisture regime). compared to the variant, the stem length was 3.5 cm, the number of productive stalks was 9.4m² / piece, the number of grains per spike was 1.6 pieces, the weight of grain in one spike was 0.11gr, the average grain yield was 3.2ts / ha higher.

Growth and development of winter wheat

Experimental areas	Stem length , sm			Number of stems, m ² / pcs	
	Tubing phase	Growing and flowering phase	Cooking phase	Total	Productivity
Control areas	26,3	68,0	77,8	363,8	337,4
Experimental areas	37,5	71,7	81,3	376,4	346,8

Table 4

Corn indicators of winter wheat

Experimental areas	The length of spike	Number of grains per spike, grains	Weight of grains per spike, g	1000 grain weight, g
1.control areas	7,0	35,1	1,22	37,0
2.experimental	7,8	36,7	1,33	38,3

areas				
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Table 5

Grain yield of winter wheat is ts / ha

Area	Repetitions				Average
	1	2	3	4	
1.control areas	40,1	40,7	41,1	39,7	40,1
2.experimental areas	43,8	42,9	43,2	41,9	43,2

CONCLUSIONS

1. Winter wheat is irrigated 3 times during the season, the norm of irrigation is 823-933 m³ / ha. the seasonal irrigation norm was 2586m³ / ha.
2. The maximum value of the ditch flow during the cultivation of winter wheat was observed in the autumn (November, December) during the harvesting of winter wheat seeds and saline washing in other areas. During this period, the water flow of the ditch was 0.050-0.067 l.s / ha. During the next January-March, the water flow of the ditch decreased by 0.022-0.025 l.s./, while the flow of the ditch increased under the influence of irrigation during the growing season of winter wheat, during this period it increased to 0.033-0.043 l.s / ha. With the end of the irrigation period of winter wheat, that is, in June it decreased to an average of 0.017 l.s / ha.
3. As a result of the formation of a favorable reclamation regime (relatively deep groundwater, reduced salt accumulation and maintenance of optimal moisture regime) during the growing season of

winter wheat compared to the control variant, the stem length was 3.5 cm, the number of productive stems was 9.4m² / piece, the number of grains per spike was 1.6, the weight of grain in one spike was 0.11gr, the average grain yield was 3.2ts / ha higher.

4. Grain yield of winter wheat was also obtained depending on the experimental areas, ie the area of the new construction (experimental variant) and the old type of fallow (control area). At the same time, the average grain yield in the experimental field was 43.2 t / ha, and in the control field - 40.1 t / ha.

REFERENCES

1. Resolution of the President of the Republic of Uzbekistan dated October 9, 2019 No pq-4486 "On measures to further improve the water resources management system."
2. Yu. Okuda, X. Ikeura, Dj.Onishi, A.Fukuo. Guidelines for measures to reduce salinity in agricultural lands in conditions of high groundwater levels. 2013 p.56.

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3. Gupta R. K, Bhumbra D. K, Abrol L. R. Effect of soil pH, Organic matter and calcium carbonate on the dispersion behavior of alkali soils. SoilsSct 37.2008 P. 251.
 4. Dospekhov B.A. "Field experience methodology". M. 1985.
 5. U. Norkulov, B.E.Izbasarov, B.Tukhtashev. Significance of the new design drainage on saline and groundwater surface areas. Journal of Critical Reviews is a SCOPUS Indexed Journal. Volume: 63 Issue: 4 Publication Year: 2020.
 6. S.T. Negmatova, B.M. Khalikov, B.E.Izbasarov. The Effectiveness Of Deep Processing Between Rows Of Cotton. European Journal of Molecular & Clinical MedicineISSN 2515-8260 Volume 07, Issue 03, 2020.