

## Effects of Irrigation Procedures on Agrophysical Properties of Soil

**B. M. Khalikov**

Ph.D Professor

**Negmatova Surayyo Teshaeвна**

K.X.F.D Senior Research

**X. M. Bozorov**

Doctoral student, Ph.D. of Scientific Research Institute of Cotton Breeding, Seed Production and Cultivation Agrotechnologies

**Annotation:** Irrigation accuracy causes to soil moisture, before irrigation, is 65-75-60% based on “field moisture capacity”, increase of bulk density and porosity. However, in exactly these variants, because of high position of crop’s growth, development and fertility, it is suitable for autumnal wheat in being learnt soil-climate condition.

**Keywords:** Sowing dates, mineral fertilizer application rates, nutrition, irrigation scheduling Fc, yield, profitability, growth stages, economic effectiveness, sierozem soils with transition to meadow soil type, winter wheat.

**Relevance of the topic.** In our country, cereals, including winter wheat, are grown mainly through artificial irrigation. Proper management of irrigation has a certain effect on the agrophysical properties of the soil, along with a rich harvest from crops. Soil volume mass, porosity and field moisture capacity are important agrophysical properties of this soil and are factors that significantly affect plant growth, development and productivity. In soils with low mass, the plant grows well and allows to grow a rich harvest.

**Level of study of the topic.** In order to produce high and stable quality crops of winter wheat in different soil and climatic conditions, their sowing times, irrigation regimes, norms and terms of application of mineral fertilizers are determined by soil mass and porosity, water reserves and nutrients in soil layers, thermal, air and microbiological processes. A number of scientists, including B.Khalikov, S.Abdurahmanov, A.Iminov, H.Atabaeva, B.Azizov and others have conducted research and made relevant recommendations.[1; 2; 3, 4]

The study of the impact of winter wheat sowing times, mineral fertilizer rates and irrigation regimes on the agrophysical properties of the soil in the conditions of grazing gray soils of Jizzakh region will further complement the work studied in previous years.

**The purpose of the study:** to determine the optimal sowing time and irrigation regime of winter wheat in the conditions of grazing gray soils of Jizzakh region, as well as the effectiveness of the annual application of nitrogen fertilizer to different standards during the development of winter wheat.

**Research methods:** Terms of sowing of winter wheat (01.10 and 15.10), norms of mineral fertilizers (N180 / P120 / K90 kg / ha) and irrigation regimes (60-70-60%, 65-75-60%) in the conditions of grazing gray soils of Jizzakh region ) experiments on the impact on the agrophysical properties of soil in 2009-2011.

The total area of the experiment was 0.75 ha. The experiment was conducted in a field setting and consisted of 20 variants and 3 repetitions. The experimental field soil is light sandy in terms of mechanical composition, groundwater varies at a depth of 1.8-2.2 m during the season.

The research was conducted annually in a new field and included “Methods of conducting field experiments” (Tashkent, 2007) and “Methods of agrochemical, agrophysical and microbiological research in irrigated cotton areas” (Tashkent, 1963) based on the methodological manual, the soil volume mass was determined using cylinders from five points of the field in the envelope method at the beginning of the season in each field and against the background of irrigation procedures at the end of the season.

ISSN 2792-4025 (online), Published under Volume: 1 Issue: 6 in November-2021

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/>

**Results of the study:** Surveys were conducted in a new field each year, and soil volume mass and porosity were determined using cylinders based on samples taken from five points in the field at a depth of 50 cm every 10 cm in the field using an envelope method.

Soil volume mass is 1.25 in the 0-30 cm driving layer of soil, respectively, at the beginning of the season; 1.23 g / cm<sup>3</sup>, 1.29 in the subsoil namely, 30-50 cm soil layer; 1.26 g / cm<sup>3</sup>. By the end of the season, when the survey results were analyzed, it was found that there were differences in irrigation regimens for both planting periods compared to the beginning of the season, namely, an increase in soil volume mass.

It is known that irrigation and rainwater seep from the top to the bottom, that is, due to their own weight, penetrate into the lower layers of the soil. During the absorption process, gases, anions, cations, micro and macro elements, organic compounds, acids and other water-soluble elements in the soil dissolve to form a soil solution. This improves the growth and development of plants, as well as the activity of beneficial microorganisms. To do this, it is important that the timing and norms of irrigation were timely and acceptable. This suggests that excessive watering times and norms may be another reason for soil soil leakage or runoff to groundwater to increase soil density.

Also, a certain part of the soil layer consists of pores, which in the process of moving water downwards fills a certain part of the pores by washing away fine dust, sand and other particles of soil from the upper layers of the soil in addition to the above. As a result, some of the gases in the pores are released into the air. It can be assumed that the volume of the soil decreases, and therefore the volume increases with the mass, the porosity decreases.

Therefore, when irrigating crops, it is important to pay special attention to soil moisture, timing and rate of irrigation.

According to the results of the study, in the 2009-2010 season, soil moisture was irrigated once in the order of 60-70-60% relative to ChDNS, 0-1-0, and soil moisture was irrigated twice in the order of irrigation 65-75-60% relative to ChDNS 0-1. -1 irrigated in the system. The fact that the amount of precipitation in this season was 545.7 mm, respectively, can be explained by the fact that the soil provided sufficient moisture to the crops and caused a lack of irrigation.

In the 2010-2011 season, in both periods, the soil moisture was 60-70-60% in relation to ChDNS in the irrigation system 0-1-1 twice, the soil moisture was 65-75-60% in relation to ChDNS in the irrigation mode three times, 0-2- 1 irrigated in the system.

When analyzing the results on sowing periods, the vegetation of crops begins after the application of seed water, which also leads to the onset of physicochemical processes in the soil.

At the end of the season, when the irrigation volume is 60-70-60% compared to ChDNS, the volume mass is 1.31-1.29 g / cm<sup>3</sup> in 0-30 cm layer of soil and 1.36-1.33 g / layer in 30-50 layers. cm<sup>3</sup>. During this period, when the irrigation regime was 65-75-60% of the ChDNS, it was found that the soil volume was 1.33-1.31 g / cm<sup>3</sup> in the 0-30 cm layer and 1.37-1.36 g / cm<sup>3</sup> in the 30-50 layer.

This is 0.02-0.02 g / cm<sup>3</sup> in the driving layer, 0.01-0.03 g / cm<sup>3</sup> in the subsoil, respectively, from 0.08 g / cm<sup>3</sup> in the driving layer of the soil at the beginning of the season, respectively, in the order of high irrigation relative to 60-70-60% soil moisture was observed to be higher than 0.08–0.10 g / cm<sup>3</sup> in the stratum. The results obtained are tabulated in Table 1.

The same pattern was found in the variants planted in 15.10. According to him, when the irrigation regime is 60-70-60% of the ChDNS, the soil mass is 0.05-0.07 g / cm<sup>3</sup> in the 0-30 cm layer compared to the first, 0.06-0.08 g / cm<sup>3</sup> in the 30-50 layer, the irrigation regime is 65-75 in relation to the ChDNS. At -60%, the volume mass was observed to be 0.07-0.08 g / cm<sup>3</sup> in the 0-30 cm layer and 0.07-0.09 g / cm<sup>3</sup> in the 30-50 layer. The difference in soil volume mass over planting periods can be attributed to air and soil temperature in addition to soil moisture.

**Table 1: Volumetric mass (g / cm<sup>3</sup>) and porosity (%) of experimental field soil**

Var №	irrigation procedures,%	soil layers, cm	soil layers, cm		Porosity,%	
			2010	2011	2010	2011
At the beginning of the season						
On average five points		0-30	1,25	1,23	51,92	52,69
		30-50	1,29	1,26	50,38	51,54
At the end of the season						
1-5	60-70-60	0-30	1,30	1,29	50,00	50,38
		30-50	1,35	1,33	48,08	48,85
6-10	65-75-60	0-30	1,32	1,31	49,23	49,62
		30-50	1,36	1,35	47,69	48,08
11-15	60-70-60	0-30	1,31	1,30	49,62	50,00
		30-50	1,36	1,34	47,69	48,46
16-20	65-75-60	0-30	1,33	1,31	48,85	49,62
		30-50	1,37	1,36	47,31	47,69

In our study, when analyzing soil porosity in the 2009-2010 season, at the beginning of the season it was 51.92% in the 0-30 cm layer of soil and 50.38% in the 30-50 cm soil layer. By the end of the season, these figures were 49.62% in the 0-30 cm layer of soil and 48.85% in 65-75-60% soil moisture when irrigated at 60-70-60% compared to ChDNS planted in 1-10.10. That is, depending on the irrigation regime, it was observed that the driving layer of the soil decreased by 2.30-3.07% compared to the beginning of the season, respectively. This situation can be explained by the fact that the number and norms of irrigation in irrigation procedures also led to an increase in soil porosity. This regularity was also confirmed during the second sowing period. The data are presented in Table 1.

**Conclusion:** Hence, irrigation procedures, i.e., 65-75-60% of soil moisture before irrigation relative to ChDNS, lead to an increase in soil volume mass and a decrease in porosity. However, it can be concluded that it is optimal for winter wheat in the studied soil-climatic conditions due to the high growth, development and yield of the plant in these variants.

#### References:

1. Abdurahmonov S, Khalikov BM, "Sanzar-8" winter wheat variety // Agriculture of Uzbekistan. - Tashkent, 2003. -№1. -B. 25.
2. Atabaeva H.N., Azizov B.M. Wheat. –T. : ToshDAU. 2008. -168 p.
3. Kholigov BM, Iminov A. Influence of mineral fertilizers and repeated crops on soil fertility and winter wheat yield in irrigated conditions of Tashkent region// Collection of articles based on the reports of the international scientific-practical conference "Current issues in cotton growing and prospects for its development", dedicated to the 80th anniversary of the Uzbek Cotton Research Institute. -Tashkent, 2009. -B. 104-112.
4. Khalikov B.M. New crop rotation systems and soil fertility. –T. : Publishing house, 2010. -B. 66.