

# Grain Yield Efficiency Of The Drip Irrigation System Of Corn In The Conditions Of Gray Pasture

Yuldoshev Ramazon Khasan ugli<sup>1</sup>, Isayev Sabirjan Khasanbyevich<sup>1,1</sup>

<sup>1</sup>National Research University "TIAME", 39, Kori Niyozzi street, Tashkent, 100000, Uzbekistan

**Abstract:** This article presents information on the effects of drip irrigation and drip irrigation on the growth, development and productivity, of corn in the conditions of alluvial meadow soils of the Bukhara region.

**Key words:** Repetitive corn, low salinity, grassland alluvial soils, drip irrigation, limited field moisture capacity, irrigation method, irrigation rate, grain yield of corn.

**Enter.** In today's climate change world, water scarcity can be felt in agricultural crops and almost at every step and every second. In the 1990s, 1 billion people could not meet their minimum water needs. This means 17 percent of the world's population. Today, 2.6 billion. The population does not have basic sanitary conditions due to water shortage. 5 million children under the age of five die every year due to the lack of clean drinking water and proper sanitation. A total of 6-7 million people die each year due to water-related diseases and accidents. In the current situation of increasing water scarcity, tensions over the ownership of water resources remain in international relations.

Special attention is paid to the development of agrotechnologies for the cultivation of field crops, taking into account the biological characteristics of field crops, soil and climatic conditions, in order to satisfy the demand of the population for food products, industry for raw materials, and animal husbandry for feed. Maize occupies the third place in the world after wheat and rice, and the first place in the group of fodder crops, [1].

Today, the cultivated area of corn is 22.5 million in the USA, 20.6 million in China, 11.8 million in Brazil. is a hectare. According to FAO data, in the structure of crops, compared to wheat, the corn area is placed in large quantities in the USA-23%, in Australia-63%, in Germany-70%, in France-43%, in Russia-3.5%, and the average yield is 7-10 tons per hectare.

Drip irrigation and high-quality production of corn are relevant for increasing grain yield in the world and in our country.

At present, in the conditions of increasing water shortage in our Republic, but also in the whole world, sufficient scientific researches have not been conducted on the development of optimal water-saving irrigation (drip) procedures for corn cultivation and determining the water consumption of the plant. Therefore, it is an urgent task to develop methods of drip irrigation in the cultivation of corn [2,3].

**Research materials and method.** Drip irrigation of repeated crop corn was conducted in 2022-2023 in the agricultural field of "Shirinobod zamin sardori", Gijduvan district, Bukhara region (the soil is meadow alluvial, the water level is 2.5 meters).

**Analysis and results.** In 2022, the average amount of humus in the arable layer of the soil of the experimental field, 0–30 cm, was 0.875%, total nitrogen was 0.084%, and the amount of total phosphorus was 0.131%, the amount of nitrogen in mobile form was 12.3 mg/kg, and phosphorus was 21 3 mg/kg and the amount of potassium in the amount of 147.2 mg/kg was determined based on laboratory analyses. During the conducted scientific observations, the results of the analysis of the amount of nutrients in the subsoil layer were studied, and it was found that the amount of nutrients in the top layer of the soil was low. It was found that humus was equal to 0.875% in the plow layer, and it was around 0.785% in the 30-50 cm layer below the plow. The percentage of total nitrogen was 0.068%, total phosphorus was 0.113%, nitrogen in mobile form was 10.9 mg/kg, phosphorus in mobile form was 19.8 mg/kg, and exchangeable potassium was 143.7 mg /kg was found to be equal.

The volumetric mass of the soil of the farm field "Shirinobod zamin sardori", Gijduvan district, Bukhara region, was determined in the experiments carried out in 2022. The average of the 0-50 cm calculated layer of the soil was divided by 5 and it was confirmed that it was equal to 1.37 g/cm<sup>3</sup>, after that it was found to be 1.38 g/cm<sup>3</sup> according to the 0-70 cm calculated layer, [4,5,6,7 ].

In determining the results of the scientific research, soil samples were taken from the defined layers in a cylinder of known volume and brought to the laboratory to determine the volumetric mass of the soil. Since the volumetric mass of the soil is relative to the dry soil, the moisture content of the soil was first determined, and the net weight of the soil was determined by the following formula.

$$d = \frac{P}{V}$$

Here:  $d$  is the volumetric weight of the soil,  $P$  is the net weight of the soil in the cylinder, in g,  $V$  is the volume of the cylinder, in  $\text{cm}^3$ .

Also, the sum of voids in the soil is called soil porosity. Porosity in different soils is around 40-50%.

Porosity is expressed as a percentage (%) and is expressed by the following formula.

$$P = 100 - \frac{d * 100}{2,45}$$

$P$ -soil porosity, in percent,  $d$ -soil specific mass,  $d_1$ -soil volume weight.

At the end of the 2022 season, when the experiment was conducted, the average of 10, 20, 30, 40, 50 cm and 70 cm of 100 sm layers was calculated for each option, and the average of 0-50 cm and 0-70 cm layers was calculated accordingly. The analysis of the books is as follows: in the section of options, options 1 and 2 of the experiment soil moisture before irrigation is 70-75-70%, the calculation layer of the soil is 0-70 cm during irrigation, irrigation is done using a simple horizontal irrigation method, in which the 0-50 cm layer is 1.41  $\text{g}/\text{cm}^3$  result was obtained, 1.42  $\text{g}/\text{cm}^3$  was recorded for the calculation layer 0-70 cm, 1.42  $\text{g}/\text{cm}^3$  and 1.43  $\text{g}/\text{cm}^3$  in the calculation layers 0-50 and 0-70 cm in variants 3 and 4 of the experiment was found to be equal to the weight, [8].

In the options where the water-saving (drip irrigation) method of the experiment was implemented, as well as the normal irrigation method, the method of determination was carried out in the case where no force was applied to the structure of the soil.

In the results of our scientific research, at the beginning of the application period, the water permeability of the soil was determined in the general background, by the end of the application period, it was determined for 6 hours, and the water lost every hour was calculated. The water permeability in the experimental field was high at the beginning of the growing period of the plants, but by the end of the period of operation, it was observed that the water permeability decreased. it was observed that it was also reduced in experimental options.

During the field studies conducted during the growth and development of repeated corn, the irrigations given during the season and the agrotechnical measures performed were carried out in drip-irrigated options (cultivation, tillage, fertilization, weed and pest control), inter-row treatment in drip irrigation. not given, all activities such as fertilizing were carried out in an automated manner. In the activities carried out in the process of direct irrigation, it was less than that of drip irrigation, because it was observed that the porosity of the soil, which increased less than the density, increased on the contrary [9,10].

In the 1st and 2nd variants of the experiment, the soil was irrigated by drip irrigation and the soil moisture before irrigation was 70-75-70%, and the number of irrigations was carried out 5 times. In the 1st irrigation, the soil moisture before irrigation was 15.2 70.6% of irrigation works were carried out, in the second irrigation 16.1 were irrigated by 74.8%, when 3, 4 and 5 irrigation works were carried out 16 and 74.7%, 16.1-74.9% and 15.1 and it was 70.2 as a percentage, in options 3 and 4 of the experiment, drip irrigation was carried out with 70-80-75% pre-irrigation soil moisture in a layer of 0-50 cm, the total number of irrigations was carried out 11 times, 1-irrigation 15.1-70.2%; 15.3-71.2% in water 2; 15.4-71.6% in the 3rd irrigation; 16.9-78.6% in water 4; 17.1-79.5% in water 5; 17.0-79.0% in the 6th irrigation; 17.1-79.5% in the 7th irrigation; 17.2-80.0% in the 8th irrigation; 17.3-80.5% in the 9th irrigation; In 9-10 irrigations, the indicators of 17.2-16.9 percent were 80.0-78.6 percent.

The data obtained on the growth, development and productivity of repeated corn and the quality indicators of the cultivated grain were obtained by the method of drip and drip irrigation, in 2023, when the soil moisture before irrigation was grown using drip and drip irrigation, the soil moisture before irrigation was 70-75-70% compared to the limited field moisture capacity. when the layer was 0-70 cm, the height of the plant was 42 sm when measured on 01.05.2023, phenological and biometric observations were made on the 1st of each month, corn was 120 sm on June 1, 190 cm on July 1, 225 cm on August 1 and it was found to be 248 cm in September.

When the grain yield of corn is analyzed by years, the soil moisture before irrigation is 70-75-70% according to ChDNS. In 2022, 64.5 t/ha of grain was obtained, in 2023, 65.1 t/ha, on average, 64.8 in two years. s/ha obtained grain yield, Table 1.

The 2nd variant of the experiment, soil moisture before irrigation is 70-80-75%, when the calculation layer of the soil is 0-70 sm in the 1st year, 65.2 s/ha in the 2nd year, and this indicator in the 2nd year It was equal to 65.3

s/ha. In variants 3 and 4 of the experiment, the soil moisture before drip irrigation of corn was 70-75-70% and 70-80-75% according to the 0-70 sm calculation layer in the 1st year, 72.7-73.8 t/ha of grain productivity is cultivated. In the 2nd year, 73.5-74.6 t/ha grain yield was obtained, and in the 2nd year, these indicators were 73.1 and 74.2 t/ha grain yield.

**1-table**  
**Repeated corn grain yield, s/ha in two years on average**

№	Options	Productivity, t/ha		Average two years, t/ha
		2022	2023	
1	Pre-irrigation 70-75-70%	64,5	65,1	64,8
2	Drip irrigation 70-80-75%	65,4	65,2	65,3
3	Drip irrigation 70-75-70 %	72,7	73,5	73,1
4	Drip irrigation 70-80-75 %	73,8	74,6	74,2

**Summary.** According to the results of our research, in the field of “Shirinobod Zamin Sardori” farm in Gijduvon district, Bukhara region, in the conditions of weakly saline, meadow alluvial soils, when irrigating repeated crop corn, the calculation layer of the soil at 0-50 cm before irrigation is in the order of 70-80-75% relative to ChDNS. It is recommended to water 2551 cm<sup>3</sup>/ha seasonally.

**List of used literature:**

1. O‘zbekiston Respublikasi Prezidentining 2019 yil 23 oktabrdagi PF-58532-sonli farmoni “Qishloq xo‘jaligida yer va suv resurslaridan samarali foydalanish chora-tadbirlari” to‘g‘risidagi qarori, O‘zbekiston ovozi gazetasi, 2019 yil, 1213-son.
2. Jo‘rayev F., Isoyeva L., Yusupova O. “Turli sug‘orish tartiblarida yetishtirilgan makkajo‘xori navlarining hosildorligi” //“Xorazm ma‘mun akademiyasi axborotnomasi”jurnali.–Xiva, 2023.– №11/1–Bet.146-149.
3. Jo‘rayev F., Isoyeva L., Yusupova O. “Water consumption per yield unit of corn varieties under different irrigation regimes”.International multidisciplinary journal for research & development SJIF 2019: Impact factor 5.2 Indiya, ISSUE 10 (2023) P. 205-207 (ISSN 2394-6334).
4. Methods of agrochemical, agrophysical and microbiological studies in irrigated lands. Tashkent. USSRCRI, 1963. P. 439.
5. Methods of agro chemical analysis of soil and plants. Tashkent 1977.
6. Mehtods of conducting field experiments. Tashkent, 2007. P. 148.
7. Cotton reference book. Tashkent. Mehnat press. 1989. P. 249-252.
8. Rijov S.N. “Optimum soil moisture in cotton culture” //Soviet cotton, 1940. №6.
9. Kovda V.A. “Fundamentals of the doctrine of soils” // Publishing Nauka, №2. Moscow, 1973. - p. 29-47.
10. V.YE.Yeremenko “Rejim orosheniya i texnika poliva xlopchatnika”. Tashkent. kn. ANUz. 1957 g 16-20 st.