

Efficiency of Using Drop Irrigation Technologies in Agriculture

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Abstract: In the article, alluvial soils of Bukhara region were irrigated a total of 13 times when low-pressure drip irrigation was used in the experimental field, where apple seedlings were planted at 1.5–2.0 m groundwater level, when soil moisture before irrigation was 70-70-60% relative to ChDNS. Seasonal irrigation standards - 2535–2620 m³ / ha. or 1865–1780 m³ / ha of irrigation water compared to the control option. The article presents the impact of low-pressure drip irrigation on the growth, development and yield of apple seedlings and the results of experiments conducted to study this irrigation technology.

Keywords: Apple seedlings, yield, phenological observations, water scarcity, water saving technologies; low pressure drip irrigation, irrigation rate, seasonal irrigation rate, limited field moisture capacity (ChDNS), pre-irrigation humidity, groundwater, mineralization, irrigation techniques, vegetation period.

Introduction

As long as man is alive, he has a need. Needs are expressed in material form, first in the form of food, clothing, accommodation and then in the form of others. It is necessary to produce the necessary delicacies to meet material needs. The material source for the production of delicacies is the soil.

Soil is a layer of upper fertile rock on the surface of the earth's crust, capable of providing them with water and nutrients continuously during the growth and development of plants.

In order for human beings to sustain and improve their lives, it is necessary to preserve the soil, increase its fertility, and improve the water, air, nutrient, and heat regimes in the soil and their properties [1].

The organization of agricultural production in our country depends on the efficient use of available water resources, uninterrupted supply of water users during the growing season and the state of efficient operation and logistics of water management. Therefore, during the years of independence, extensive work has been done to reform the water management system, implement structural changes in the system, radically improve logistics, sustainable financing of modernization of water management enterprises. In particular, Presidential Decrees PQ-1958, PQ-3405, PQ-4499 were adopted to improve the reclamation of irrigated lands and the use of water-saving technologies in the country.

Today, the following types of water-saving technologies are used in the fields of our country.

1. Irrigation of the field with a film;
2. Use of flexible film pipes instead of pipes;
3. Application of underground irrigation technology, the amount of water supplied to the field is reduced to 25-30%, no tillage is obtained;
4. Irrigation (mainly annual crops are irrigated).
5. Drip irrigation [6].

Among these water-saving technologies, drip irrigation saves 20% to 80% of water compared to other irrigation methods depending on the crop and soil type, drip irrigation reduces material resources and manual labor, and fertilizer is not used for fertilization.

The purpose of the study. The meadows of Bukhara region are scientifically based on the technology of local low-pressure drip irrigation of apple orchards of golden delishes in alluvial, mechanically heavy sandy soils, groundwater level 1.5-2.0 m, mineralization 1.0-3.0 g / l. development of scientific and practical recommendations for studying the order of irrigation and their impact on the growth, development and yield of apples.

Research objectives:

- determination of soil conditions (type, mechanical composition, water-physical properties and productivity) of experimental fields;
- determination of hydrogeological and reclamation conditions of experimental fields;
- Identification of scientifically based irrigation regimes of local low-pressure drip irrigation of apple orchards of Golden delishes in the conditions of alluvial soils of meadows of Bukhara region with a groundwater level of 1.5-2.0 m mineralization of 1-3 g / l;
- To determine the water-physical properties of the soil, salt regime, changes in groundwater level and mineralization, their growth, development, yield and cost-effectiveness of irrigation procedures of local low-pressure drip irrigation of orchards Golden delishes.

Method of work: VV Shabanov and EP Rudachenko calculated the representativeness of the field experimental field in the research, statistical analysis of productivity using WinQSB-2.0 and Microsoft Excel, BA Dospekhov's method of analysis of variance and SPSS (Statistical Package for Social Science) computer mathematical statistical analysis methods were used using the program.

Scientific novelty of the research: Meadows of Vobkent district of Bukhara region are alluvial, mechanically heavy sandy soils, groundwater level is 1.5-2.0 m, mineralization is 1.0-3.0 g / l. Golden delishes apple orchards are used for local low-pressure drip irrigation. developed a scientifically based irrigation regime and identified their effectiveness in saving river water and reducing the negative effects of water scarcity;

- The effect of irrigation regimes of "Golden" apple orchards on local low-pressure drip irrigation technology on their productivity was determined on the basis of BA Dospekhov's method of analysis of variance;

- In order to save water resources in times of water scarcity, the use of local low-pressure drip irrigation technology to increase the efficiency of 1 m³ of river water, the development of their apple seedlings growth, development, productivity and cost-effectiveness of irrigation procedures is urgent.

The main part. Field experiments Local low-pressure drip irrigation of apple orchards of Golden delishes variety in the conditions of alluvial, mechanically heavy sandy soils with meadows with groundwater level of 1.5-2.0 m, mineralization of 1.0-3.0 g / l in Vobkent district of Bukhara region scientifically based irrigation regimes have been developed for its growth, development, productivity and cost-effectiveness of irrigation regimes. The experiments were performed on the following systems (Table 1).

Mechanical composition of experimental field soil NA Kachinsky[5] by definition heavy sand belongs to the type of soils with mechanical composition.

Options	Irrigation technologies	Irrigation techniques Elements	Pre-irrigation soil moisture, % of ChDNS	2	local low pressure drop irrigation in technology irrigation	m	ons
				3		irrigation pipe length 200 m	70-70-60
1	irrigation, control	Egat length 200	factual observati				

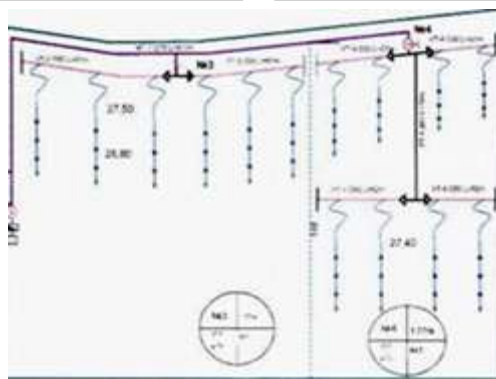


Figure 1. Schematic diagram of a low-pressure drip irrigation system in an experimental field

Experimental field Soil bulk density At the beginning of the growing season, the bulk density of the soil was 1.31–1.33 g / cm³ in the 0–30 cm layer, 1.39–1.41 g / cm³ in the 30–50 cm layer, and 1 in the 0–100 cm layer. , 40–1.42 g / cm³. In drip-irrigated variant 2, at the end of the growing season, the bulk density of the soil is 1.32–1.33 g / cm³ in the 0–30 cm layer, 1.40–1.41 g / cm³ in the 30–50 cm layer, and 1 in the 0–100 cm layer. , 41–1.42 g / cm³, or at least 0.01 g / cm³ in the 0–100 cm layer compared to other options. Towards the end of the growing season, in the 1st control variant, the bulk density of the soil was 1.34–

1.36 g / cm³ in the 0–30 cm layer, 1.43–1.44 g / cm³ in the 30–50 cm layer, and 1 in the 0–100 cm layer. , 44–1.45 g / cm³, or an increase of 0.04–0.05 g / cm³ per vegetation in the 0–100 cm layer [2].

- 1 water level stable container; 2 water intake plastic pipe; 3 distribution pipe;
- 4-drop polyethylene pipe; 5 container of mineral and organic fertilizers; 6 taps. [3,4].

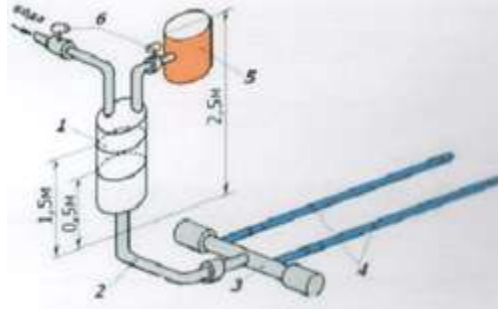


Figure 3. Schematic of a low pressure drip irrigation system.

The number of drops in 1 seedling is 2 pcs. The thickness of the 2 hoses is 0.1 mm. Water consumption of the 3rd dropper is 3-3.7 l / h. In system 4, the working pressure is 0.5-3 m. The permissible amount of 5 suspended solids is 5 g / l. The allowable size of the 6 axes is 1-2 microns. 7 Terms of use - field slope index $0.003 < i < 0.03$. [3,7].

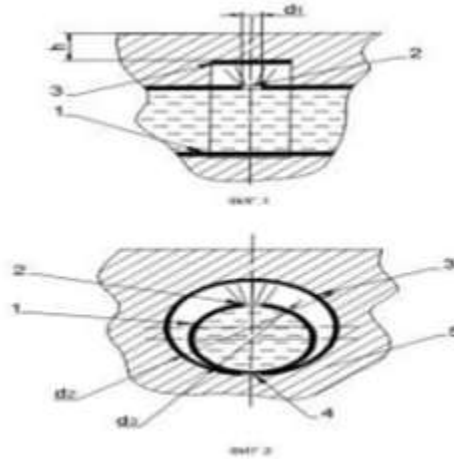


Figure 4. Constructive scheme of the drip

In all variants irrigated using local low-pressure drip irrigation technology of the experiment, pre-irrigation soil moisture was carried out in the order of 70-70-60% and 70-80-60% in relation to ChDNS. In the irrigated control variant, this figure was determined by factual observations.

According to the data in Table 2, in the production control variant 1 of the experiment, apples were irrigated five times according to the irrigation 1-2-1 scheme during the growing season, with irrigation norms of 1080-1210 m³ / ha and seasonal irrigation norms of 4400 m³ / ha.

Options	Irrigation technologies	Irrigation techniques elements	Pre-irrigation soil moisture,% of ChDNS	Irrigation norm, m ³ / ha	Irrigation between term, day	Seasonal irrigation norm, m ³ / ha
1	irrigation, control	edge length 200 m	factual observations	1070-1110	26-31	3964
2	local low pressure drop irrigation in technology irrigation	irrigation pipe length 200 m	70-70-60	179-204	10-11	2060
3			70-80-60	179-210	11-13	2170

In the local low-pressure drip irrigation technology with an experimental irrigation pipe length of 200 m, pre-irrigation soil moisture was 70-70-60% relative to ChDNS, in option 2, irrigation was 13 times in scheme 1-8-4, with irrigation norms of 187-206 m³ / ha and seasonal irrigation norms were 2535 m³ / ha. In the local low-pressure drip irrigation technology, the length of the irrigation pipe is 200 m, the pre-irrigation soil moisture is 70-80-60% relative to the ChDNS, in option 3 irrigation is 13 times in the 1-9-3 scheme, the irrigation norms are 187-208 m³ / ha and seasonal irrigation norms were 2620 m³ / ha. This is 1780 m³ / ha or 59% less than the control[3,4].

The effect of drip irrigation on the growth, development and yield of apple seedlings.

Experimental control, ie when irrigated, the average fruit yield was 7.2 tons per hectare per year, while in the case of the local low-pressure drip irrigation system using 200 m of irrigation pipes, this figure averaged 9.5 tons per year.

Impact of irrigation technologies and procedures on apple yield (average 1 year)

Options	Irrigation technologies	Irrigation techniques Elements	Pre-irrigation soil moisture,% of ChDNS	Seasonal irrigation norm, m ³ / ha	Economic al water, m ³ / ha	Gross productivity t / ha	The difference
							+/-
1	irrigation, control	edge length 200 m	Traditional irrigation	4400	-	7.2	
2	local low pressure drop irrigation in technology irrigation	irrigation pipe length 200 m	70-70-60	2535	1865	9.4	+2.2
3			70-80-60	2620	1780	9.5	+2.3

In this field, the number of irrigations was 4 times, the seasonal water consumption was 4,400 m³ / ha, and the average annual gross yield was 7.2 t / ha. The highest yield in the experimental field (9.5 t / ha) was obtained in the irrigated variant of the local low-pressure drip irrigation system at a rate of 2620 m³ / ha with a length of 200 m, pre-irrigation soil moisture in the order of 70-80-60% relative to ChDNS.

Based on the results of experimental observations and laboratory analysis, the following conclusions are presented:

1. The following optimal technical and design elements and parameters of local low-pressure drip irrigation technology were identified: 1 number of drips on 1 apple seedling; pipe wall thickness 0.1 mm; water consumption of the drip is 3-3.7 l / h; working pressure in the system 0.5-3.0 m; the allowable amount of suspended solids is 5 g / l and the permissible size of suspended solids is 1-2 microns. As a result of the research, it was possible to develop a local low-pressure drip irrigation technology based on optimal technical and design parameters.

2. Local low-pressure (TIQXMMI) drip irrigation technology is 30% cheaper than drip irrigation technology in Israel and Turkey, and all components are made in our country from local raw materials.

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