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Water-Saving Irrigation Technology Uses

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ABSTRACT

This article presents the results of field experiments of the authors in theoretical and natural conditions. Field experiments were carried out on the territory of the Hodjayakshaba MFY of Kagan district, Bukhara region. The technology of muddy water irrigation for drip irrigation of gardens has been developed. The implementation of drip irrigation technology in intensive gardens has resulted in a 20-60% reduction in water consumption on arable land, up to 50% on mineral fertilizers and up to 30% on fuel and lubricants. Also, the level of ground water does not rise due to the irrigation water requirements of the plant and excessive water supply, low water evaporation from the soil, as well as uniform moisture throughout the field.

KEYWORDS: *irrigation, drip irrigation, irrigation methods, sludge water, ground water, water resources, salinization, root, evaporation, agrotechnics, water shortages, water saving technologies, pre-irrigation moisture, mineralization, irrigation techniques, growing season*

INTRODUCTION

Strategy of actions on five priority directions of development of the Republic of Uzbekistan for 2017-2021 in the section "Modernization and accelerated development of agriculture" will further improve the reclamation of irrigated lands, the development of melioration and irrigation facilities, intensive methods of agricultural production, modern agricultural technologies. Introduction of high-performance agricultural machinery these are the main tasks. Decree by the President of the Republic of Uzbekistan dated November 27, 2017 No PP-3405[2]

The decision was mainly aimed at improving the efficiency of irrigated land, the use of low irrigation water, and higher crop yields. The population of Uzbekistan will reach 39 million by 2030 Due to climate change, Uzbekistan's water resources are estimated at more than $ 7 billion. m3 is expected to decrease. At the same time annual water resources amount to 44 bln. cubic meters of water per capita and 1130 m3 per capita. The Decree of the President of the Republic of Uzbekistan dated October 25, 2019 "On Measures for Expanding Mechanisms to Promote the Implementation of Water-saving Technologies in Agriculture" provides for the procedure of state support for introduction of water-saving irrigation technologies from January 1, 2020. The introduction of drip irrigation technology equals to $ 8 million per hectare. Sums will be provided.

The purpose of the study

Alluvial, mechanically heavy sandy loam soils of Bukhara region, scientifically based on irrigation method for drip irrigation of gardens and vineyards with the level of ground water 1.5-2.0 m, mineralization 1.0-3.0 g / l and their growth. The development of scientific and practical recommendations for the study of the impact on development, productivity and productivity.

Research objectives:

- Determination of soil conditions (type, mechanical composition, water-physical properties and productivity of experimental fields);
- Determination of hydro geological and ameliorative conditions of experimental fields;
- Determination of scientifically based irrigation methods of drip irrigation of gardens and vineyards in the grassy alluvial soils of Bukhara region with mineralization of 1–2.0 m / l of ground water level 1–3 g/l;
- Determining the impact of scientifically based on irrigation regime on drip irrigation of gardens and vineyards on water-physical properties of soil, salt regime, changes in soil surface water and mineralization, their growth, development and productivity.

Methods of fieldwork: Field, laboratory researches and phenological observations were conducted on the basis of "Field experiments" (Research Institute of Agro technologies of Crop Breeding and Seed Production) (PITI 2007).

Scientific novelty: Drip irrigation of gardens and vineyards in muddy water with alluvial, mechanically heavy sandy soils, ground water level 1.5-2.0 m, mineralization 1.0–3.0 g / l in Kagan district of Bukhara region. a scientifically justified irrigation method has been developed and their efficiency in reducing the negative effects of river water shortages and water shortages has been established;

It is important to conserve water resources in conditions of water scarcity, apply drip irrigation technology to increase the efficiency of 1 m3 of river water, to study their impact on the growth, development and productivity of gardens and vineyards.

The main part: More than 90% of water resources are used in agriculture, primarily in agricultural production, with the aim of ensuring food security of the population [3]. In recent years, the welfare of the population of the country has been improving dramatically, and its number has been increasing year by year. However, water resources per capita

are decreasing from year to year due to limited water resources. Analysis shows that over the years, the demand for water is increasing, so we need to use a drop of water and use it wisely.

Drip irrigation system is a pressure irrigation system designed to supply the plant with the required amount of water to its root surface in the required amount of time.

With the introduction of drip irrigation, water use and crop irrigation have a number of advantages. With the introduction of technology, the main goal is to save water for drip irrigation, water is only given to the root zone of the field, and other areas remain dry. The irrigation regime is appropriate for the water demand of the plant and is not supplied with excessive water, with low evaporation from the soil and water does not disperse across the field.

To date, M.Khamidov, B.Matyakubov, M.Sarimsakov, Sh.Azizov, SA Mamatovs are doing research on the use of drip irrigation technology. They were used only when muddy water was discontinued, and we had direct use without interrupting muddy water.

Results of the study: The implementation of drip irrigation technology of intensive orchards on the area of 3 hectares in the educational and scientific center of Bukhara branch of the Institute for Drinking Water. Given that till now drip irrigation is only used with clean water, direct drip irrigation with muddy water is practiced for the first time.

Irrigation norms and yield of vineyards

Years of research	Experiment options	Total water consumption, m3 / ha	Yield, ts / ha	Water consumption per 1 ts of crop, m3	Sugar content,%
3 Year	Furrow irrigation	2580	152,6	30,1	21,8
	drip irrigation	1365	284,4	13,1	22,1
5 Year	Furrow irrigation	4150	198,1	24,4	20,7
	drip irrigation	2850	421,2	18,2	21,9

During the experiments, water savings were up to 40%, while in conventional irrigation water consumption was 4200 m3 / ha, and for drip irrigation the water consumption was 2500 m3 / ha (Figure 1). Fertilizers saved 52% compared to usual. At the beginning of the vegetation season, the average ground water level was 194-198 cm, and in the middle of the growing season, between July and August, groundwater levels were about 175-181 cm. The soil weight was 1.31 g / cm3 in 0-30 cm of plowed soil, 1.39 g / cm3 in subsoil (30-50 cm) and 1.40 g / cm^3 in 0-100 cm layer.

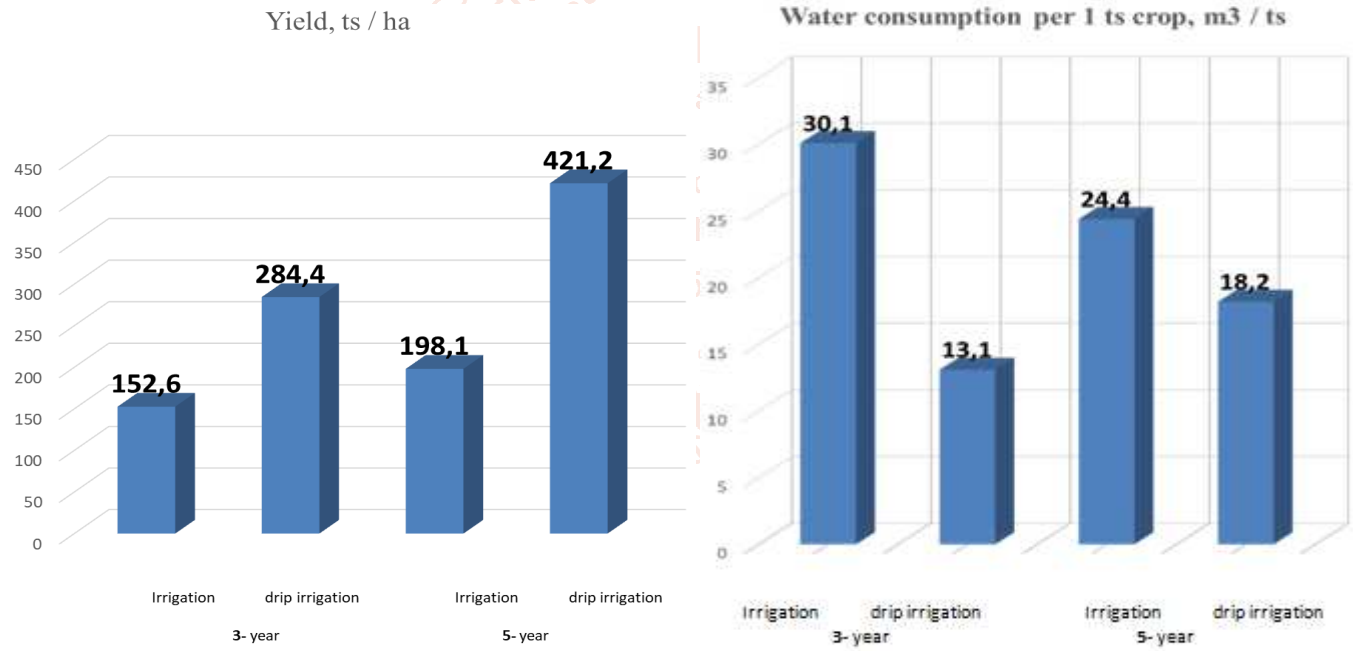

Figure 1 Watered condition of the vineyard

According to the results of the limited field moisture content of the soil, in the 0-50 cm layer of soil it was 19.5% of the soil mass, while the limited field moisture content in the 0-100 cm layer was 19.8% of the dry soil weight. Drip irrigation was performed 10 times, irrigation rates were set at 240-260 m3 per hectare, seasonal irrigation rate was 2450 m3 / ha, or less than 1550 m3 / ha was used as a control.

According to soil salinity data, at the beginning of the growing season, the chlorine ion was 0.025% at the beginning of the growing season and 0.021% at the end of the growing season, and 0.021% and 0.012% in the 0-100 cm layer, respectively. . At the beginning of the growing season the dry residue in the plowed layer was 0.526%, at the end of the growing season it was 0.297%.

Conclusion

In the active soil layer, it was 0.479% and 0.282%, respectively, and the seasonal salt accumulation coefficient was 1.79 in the deposition layer, 1.77 in the dry residue, and 1.76 in the 0-100 cm layer, respectively. , Was 70. Based on the observations of the experiments and laboratory analyzes, we can conclude the following. It is recommended to apply drip irrigation and to irrigate the soil with irrigation norms of 240-260 m3 / ha and seasonal irrigation norms of 2450 m3 / ha, keeping 70-80-60% of pre-irrigation soil moisture.

The soil layer keeps the soil soft. There is no loss of water for sewage and filtration in the field, uniform soil moisture is maintained on different slopes. Even with minimal irrigation, the growth and development of seedlings is accelerated.

Increased demand for water resources requires the efficient and rational use of water resources to mitigate the negative effects of water scarcity, achieve high yields and ensure food security. To date, research has been conducted on the development of new water-saving irrigation technologies based on scientific research, which shows that high levels of mineralization are maintained by drip irrigation. Economically, 50% of the cost will be lower and positive results will be achieved.

Reference

[1] Decree of the President of the Republic of Uzbekistan from February 7, 2017 President's Decree N 4947.

[2] Decree of the President of the Republic of Uzbekistan "On the State Program on Development of Irrigation and Improvement ameliorative condition og irrigated Lands for 2018-2019" of November 27, 2017, No PD-3405.

[3] Methods of field experiments Tashkent, 2007, 176 p.

[4] J.Fazliyev. 2018, "MODERN IRRIGATION METHODS FOR GARDENS" Science № 22 2г. Pereyaslav - Khmelnitsky. Ukraine №22, 24-26 p.

[5] И Худайев, Ж Фазлиев, Н Шаропов. 2019. Капельное орошение – как водосберегающий способ орошения садов и виноградников. «Школа Науки» • № 4 (15) • Март 14-15 б

[6] Khamidov, M.K., Khamraev, K.S., Isabaev, K.T. 2020,Innovative soil leaching technology: A case study from Bukhara region of Uzbekistan. IOP Conference Series: Earth and Environmental Science, 422(1), 012118

[7] Khamidov, M., Matyakubov, B., Isabaev, K. 2020, Substantiation of cotton irrigation regime on meadow-alluvial soils of the Khorezm oasis. Journal of Critical Reviews, 7(4), c. 347-353

[8] Khamidov, M., Khamraev, K., Azizov, S., Akhmedjanova, G. 2020, Water saving technology for leaching salinity of irrigated lands: A case study from Bukhara region of Uzbekistan. Journal of Critical Reviews, 7(1), c. 499-509

[9] Khamidov, M., Muratov, A. 2021, Effectiveness of rainwater irrigation in agricultural crops in the context of water resources. IOP Conference Series: Materials Science and Engineering, 1030(1), 012130

[10] Khamidov, M.Kh., Isabaev, K.T., Urazbaev, I.K., Islomov, U.P., Inamov, A.N. 2020, Hydromodule of irrigated land of the southern districts of the republic of karakalpakstan using the geographical information system creation of regional maps. European Journal of Molecular and Clinical Medicine, 7(2), стр. 1649–1657

[11] Khamidov, M., Isabaev, K., Urazbaev, I., ...Inamov, A., Mamatkulov, Z. 2020, Application of geoinformation technologies for sustainable use of water resources. European Journal of Molecular and Clinical Medicine, 7(2), pp. 1639–164

[12] Khamidov, M., Khamraev, K. 2020, Water-saving irrigation technologies for cotton in the conditions of global climate change and lack of water resources. IOP Conference Series: Materials Science and Engineering, 883(1), 012077