EFFECTS OF IRRIGATION TECHNIQUE ELEMENTS ON IRRIGATION NORMS AND YIELDS INTENSIVE APPLE ORCHARDS

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Annotation. In this article, we are talking about the use of water-saving equipment and technology for irrigating an intensive apple orchard in the conditions of meadow-alluvial soils of the Republic of Uzbekistan. The optimal norms and elements of irrigation techniques for intensive apple orchards have been studied.

Keywords: elements of irrigation technique, drip irrigation, intensive apple orchards, research conditions, typical gray soil, meadow-alluvial soils, water consumption of intensive apple orchards, growth and development of intensive apple orchards, apple tree productivity.

Existing problems. In the context of global climate change in the world, in developed countries, special attention is paid to conducting large-scale research and development, improving the irrigation regime for crops, protecting the environment, as well as developing water-saving irrigation technologies, introducing irrigation methods and technologies in natural conditions, determining the elements of optimal Irrigation techniques designed to mitigate these negative impacts, as depletion of fresh water, deforestation and woodlands, soil degradation, food insecurity and water scarcity require dramatic increases in agricultural water use efficiency.

Of great importance is the efficient use of irrigated lands, the introduction into practice of irrigation equipment and technologies that ensure high and stable yields, the achievement of a minimum water consumption for irrigation and the timely provision of crops with the necessary moisture. On the basis of field and laboratory studies conducted on small areas of intensive apple orchards, scientifically based fruit growing systems have not yet been developed using improved methods for calculating seasonal water consumption, regimes, terms and irrigation rates, obtaining a regular high-quality and stable harvest of apples, as well as the effective use of water resources.

Introduction. Land and water are invaluable goods that cannot be replaced by any other source in human activity. Millions of years ago, mankind began to use the land, that is, animal husbandry and agriculture. The population grew slowly. As a result, available arable land for agriculture was gradually developed and reduced in size. By the 19th and 20th centuries, in order to expand the scale of agricultural production, even reserve lands were developed and included in the crop rotation system.

Mankind's ruthless treatment of natural, land and water resources and the consequences of today's attempts to think only about the present, today cause great grief to the people of the world, especially in the Aral Sea region.

According to experts, the water level in the Aral Sea has decreased by 11.7 times compared to 1960. Irrigated, saline territories of different levels in the country account for more than 47% of the total area. The scale of moderately and strongly saline areas is about 21% [5].

In addition, there are over 750,000 non-irrigated arable land in the country, which are currently mainly crops. These crops are grown only at the expense of atmospheric precipitation (10-15 c/ha). So the fate of this crop depends on the weather.

Well, the question arises whether it is possible to use such lands in the future, to attract technologies that will make it possible to obtain high and high-quality crops.

In this regard, we carried out research work aimed at studying the creation of intensive fruit orchards in the conditions of mountainous, foothill and arid regions of the republic. The influence of the norm and elements of irrigation technique on the agrophysical and water-physical properties of the soil during drip irrigation of an intensive apple orchard was studied. The elements of drip irrigation technique, irrigation rate and water consumption of intensive apple orchards are scientifically substantiated.

Research results. For the first time, a methodology for conducting field experiments based on a four (full) factorial experiment, and a mathematical model for determining the dynamics of soil moisture to determine the irrigation rate have been created.

With drip irrigation of intensive apple orchards, the method for calculating the volume formed by the moisture configuration in the soil-soil moisture zone has been improved, an expression for determining the volume of moisture has been obtained $\theta = \overline{F_1}\int_0^t sin^2\frac{\pi\tau}{a}\,d\tau + \overline{F_2}\int_0^t sin^3\frac{\pi\tau}{a}\,d\tau$ and, based on it, numerical solutions of the error compared to the results of field studies amounted to an average of 4%;

improved method for calculating irrigation rates for drip irrigation of intensive apple orchards proposed by V.N. Shkura

$$(N_{орош})_{капел.} = \pi\frac{a\cdot b}{2}\cdot H\cdot\gamma_{о.м..}\cdot\left[F_1\int_0^t\sin^2\frac{\pi\tau}{a}d\tau + F_2\int_0^t\sin^3\frac{\pi\tau}{a}d\tau\right]\cdot(\beta_2-\beta_1)$$

Under various soil and climatic conditions, when irrigated according to the scheme of 75-80-70% in relation to the FPV, with the provision of moisture of 0.8 m of the calculated soil layer, an increase in the use of atmospheric precipitation by 4.4% compared to the control, the use of irrigation water by 5.8%, reducing the total water consumption by 6.3%, and ensuring a high yield of apples up to 9.5 t/ha.

The scientific basis for the influence of irrigation methods and technologies on the growth, development, weight of the apple crop and the yield of intensive apple orchards, aimed at saving irrigation water, has been developed.

On the experimental field, carried out in the conditions of meadow alluvial soils of the Sredne-Chirchik district of the Tashkent region, the influence of the elements of irrigation technique on the irrigation and irrigation rate was studied when irrigating intensive apple orchards through a drip irrigation system according to the scheme of 75-80-70% in relation to WPV, providing humidity of calculated soil layers is 0.5-0.8 and 1.0 m. while the irrigation rate was 1200 m ^{3} /ha, in the experimental variants in which irrigation was carried out by moistening 0.8 m of the soil layer, the irrigation rates were 50-90 m ^{3} /ha, and the irrigation rate was 1017-950 m ^{3} /ha (Fig. 1).

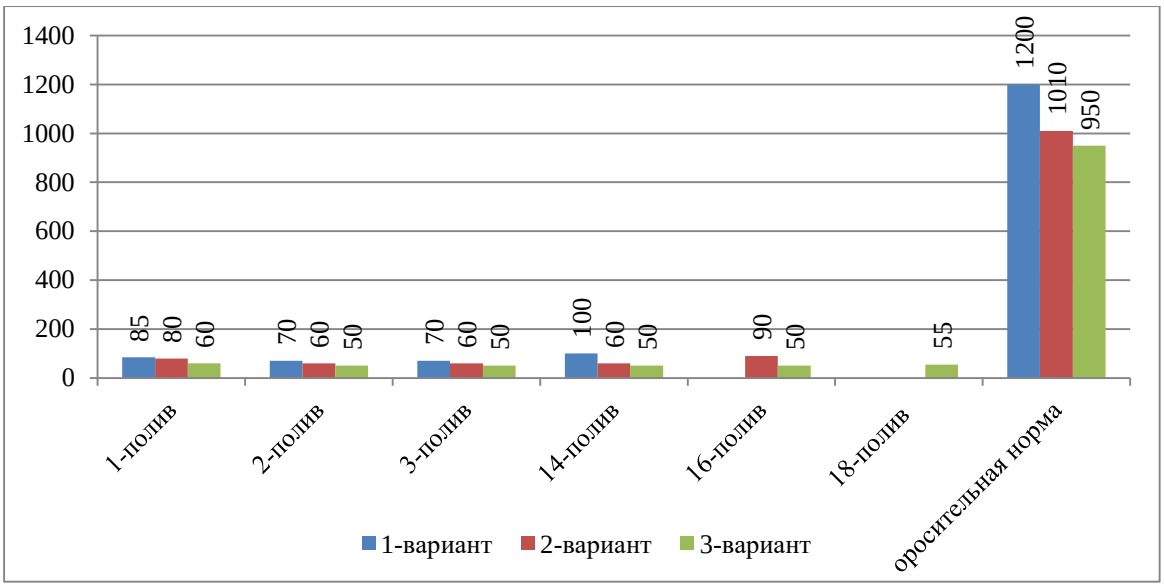

Figure 1. Irrigation and irrigation rate of intensive apple orchards, m ^{3} / ha

In this experimental field, the yield of apples in the control variant averaged 28.1 t/ha and the weight of one apple was 99.7 g, with an estimated soil layer of 0.8 m from the FPV 75-80-70%, with irrigated variant 3, the yield averaged 35.2 t/ha, and the weight of one fruit was 114.3 g, which is 3.8 t/ha and 8.6 g higher, providing 0.5 m of soil layer with moisture, and 7.1 t/ha and 14.6 g higher than in the control variant irrigated with 1.0 m of the estimated soil layer (Fig. 2).

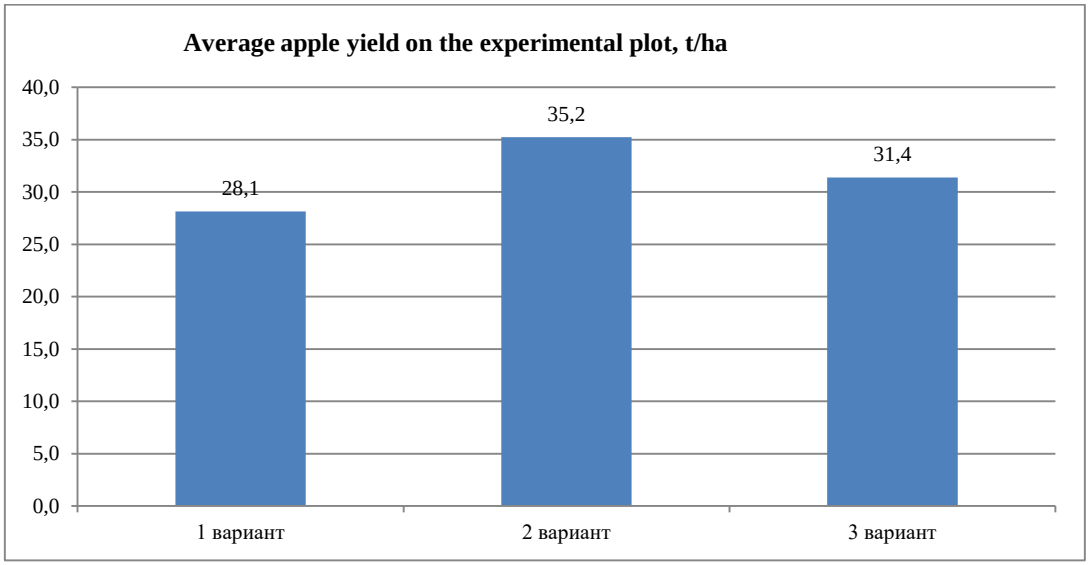

Figure 2. Average yield of apple trees on the experimental plot, t/ha

Conclusions. With drip irrigation of intensive apple orchards at a regime of 75-80-70% of the FPV using elements of irrigation technology (with moistening of the calculated layer of 0.8 m of soil) in irrigated, meadow-alluvial soils of the republic, it makes it possible to increase the yield of apple fruits up to 12 .3 t/ha due to the formation of the optimal benefit of the obtained soil conditions and the reduction of the irrigation rate to 46-52% compared to the traditional method.

Recommendations. The use of drip irrigation in intensive apple orchards in the conditions of meadow-alluvial soils of the Tashkent region, where groundwater occurs at a depth of up to 2.0 m, moistening of the calculated soil layer of 0.8 m at a regime of 75-80-70% of the

maximum field moisture capacity, set irrigation rate 50-60 m ^{3} /ha, and irrigation rate 900-1100 m ^{3} /ha.

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