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Research Article

IRRIGATION REGIME FOR POMEGRANATE (PUNICA GRANATUM L.) ON LIGHT STONE-GRAVEL GRAY SOILS (BASED ON THE EXAMPLE OF THE FERGHANA REGION)

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ABSTRACT

In the article, given the water shortage in the glen regions, where light stone-gravel sierozems are widespread, it is important to effectively use these regions and place plants taking into account the soil and climatic conditions of the region and area. water demand, therefore, taking into account the water shortage in the conditions of light stone-gravel gray soils of the Fergana region, it is necessary to study the features of irrigation methods, timing and standards of pomegranate plants that are resistant to erosion.

KEYWORDS

Pomegranate, soil, fertility, farming, irrigation, area, seed, fruit, hectare, yield.

INTRODUCTION

Today, the total irrigated land used in agriculture in the world is 480 million hectares and the land used during the year is 41 million hectare. The share of total irrigated arable land is 31.5% in China, 27.5% in India, 5% in USA, 3.5% in Russia and 3.3% in Pakistan. Also, in 9 countries of the world, such as Argentina, Australia, Bangladesh, Kazakhstan, Myanmar, Thailand, Turkey, Uzbekistan and Vietnam, this indicator is 1-2 percent. In

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the conditions of water shortage in the world, the rational use of water for irrigation of agricultural crops is of particular importance. Since meeting the water demand of agricultural crops is directly related to the correct organization of irrigation, the improvement of the method of calculating the rate of irrigation of agricultural crops is considered one of the important issues.

A number of countries such as Israel, Singapore, the Netherlands, Spain, Azerbaijan, and Tajikistan can be included in the study of the rational use of water and its dependence on agriculture. For example, in the state of Israel, water reuse is 87%, and about 90% of the reused water is directed to agriculture, and food products are grown in desert areas.

In addition, although two-thirds of the earth's surface is covered with water, 97.5% of it is salt water and is unsuitable for use. The remaining 2.5% are fresh water resources, 79% of which are permafrost, 20% are groundwater 1% are rivers and lakes. Therefore, rational use of water in agriculture is one of the urgent issues of today.

According to the analysis of scientists of the world, taking into account the thickness of the seedlings planted in the cultivated area determining irrigation procedures, performing drip and rain irrigation according to the mechanical structure of the soil traditional methods of irrigation according to the mechanical structure of the soil, scientific research is being carried out in the cross-section of regions.

According to FAO information, pomegranate crops are grown on more than 300,000 hectares worldwide, and more than 3,000,000 tons of pomegranate products are grown in these areas. In this regard, India, Iran, Turkey, China and the USA are the main producing countries and they produce more than 76% of the world's pomegranate products [1].

In Uzbekistan, the main part of the land fund (about 62%) belongs to the category of agricultural land types, of which 9.6% of the total land resources are irrigated lands by using this land fund effectively, the population is provided with food fruit and vegetable and dairy products. In addition to satisfying the needs of the people, it is used for the purpose of growing the necessary raw materials for the development of economic sectors.

Currently, in such conditions of increasing population and limited water resources, the issue of the state of water resources and their rational use, the introduction of cost-effective technologies in irrigation and irrigation works is one of the urgent problems on global and local scale [2, 3, 4].

Scientific studies have shown that large amounts of water loss from plant cells can cause the matrix potential to drop to zero (that is, to atmospheric pressure), and plants begin to wilt. In this case, the potential of water is equal to the osmotic potential, and it partially decreases.

During the period of 2018-2022, the President of the Republic of Uzbekistan plans to gradually reduce the areas of cotton and grain crops that are planted in poor land reclamation, replace them with economically more productive crops, increase the efficiency of farm activities, rational use of land and water resources, special attention is being paid to the increase of fruit and vegetable, potato and field products.

In this regard, the decision of the Cabinet of Ministers of the Republic of Uzbekistan No. 791 of October 4, 2018 "On measures to increase pomegranate cultivation and development of the sector in Fergana

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region" was adopted. The main focus is one of the most pressing issues in the cultivation of environmentally friendly food products in agriculture. The level of study of the problem. Nowadays, in the conditions of water scarcity caused by global climate change, the use of water-saving technologies in irrigation of agricultural crops, as well as conducting scientific research in this field, is considered one of the urgent issues today.

In addition to the method of irrigation of agricultural crops, scientists have not sufficiently studied the influence of different irrigation methods, systems and cultivation technologies of the pomegranate plant on climatic conditions, water-physical properties of the soil, nutrient regime, plant growth, development, productivity and its quality.

In some cases, there have been problems in getting the intended harvest from pomegranates. Taking this into account, the agro-firm "Anorchilik" was established and focused on the work to be carried out in order to achieve the important tasks of growing the varieties of local pomegranate varieties with the highest productivity index, and in order to du this for the first time, 289 hectares and now more then hectares of cultivated areas are engaged in pomegranate cultivation. Nowadays cultivated around pomegranate cultivation 750 hectares.

Our research has shown that it is necessary to grow pomegranates in the conditions of light-colored stone-gravel gray soils in the glen regions of Kuva, Kuvasay, Tashlak, Fergana districts of Fergana region, to select pomegranate varieties that can produce abundant and high-quality crops, to create profitable pomegranate orchards, to produce intensive methods of irrigation systems in these orchards. and is focused on finding a solution to the problem of further improvement of this irrigation system [5,6].

One of the drip irrigation systems built in Uzbekistan in the pomegranate orchards of Kashkadarya region (1990) highlighted the advantages of the drip irrigation system and the effectiveness of their use [9].

On the basis of researches, it has been found that these drip irrigation systems use up to several times less water than the usual drip irrigation. In particular, it has been proven that the water used for irrigation in gardens and vineyards is used up to 60% less than usual.

Pomegranate is drought-resistant, but requires regular watering to obtain a high yield and large fruit mass. In Israel, under normal conditions, the amount of water applied annually is 5000 to 6000 m3/ha, but it has been reported that in desert areas it can be up to 12000 m3/ha [10].

Pomegranate trees in Spain are reported to be irrigated at approximately 4500–5500 m3/ha, however, water resources in the area are limited and it is important to implement an economical irrigation system while maintaining yield and fruit quality. Therefore, it has been proven that the use of an economical irrigation system in crop irrigation leads to savings in water consumption.

The process of pomegranate irrigation was carried out by the researchers in 3 stages, i.e. in options up to 100, 50, 25%, and the results show that irrigation of crops directly affects the fruit's biological and chemical composition.

It has been noted that it is difficult to find ways to predict the water needs of any plant being cultivated. In this regard, when searching for the water requirement of a plant, first of all, the exact size of the area where the crop is being cared for, the method used, climatic conditions and agrotechnical measures

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are taken into account, and the water requirement of any crop is tested in new conditions.

In order to calculate the water requirements of crops under different soil-climatic conditions, guidelines for the application of agrotechnical measures were presented based on the recommendations developed by the FAO group at the meeting held in Lebanon (1971) and Rome (1972) on the water requirements of crops, and these guidelines were summarized again in 1975 and published.

According to the information provided by the researchers, the pomegranate originated from Central Asia and Persia, 80% of the pomegranate fruit is water, and it should be noted that the pomegranate fruit contains from 613 to 1200-1300 seeds. 2-6 inches, (5,08-15,24 sm), depending on the size of the pomegraete fruit pomegranate seedlings begin fruiting in 3 years after planting, sprouts (pargama) begin fruiting in 2 years, and fully fruit in 8-10 years [12].

Scientific researches on the development of the effect of drip irrigation on the productivity of pomegranate in the conditions of light-colored stony-gravel gray soils of Fergana region and on determining the effect of this drip irrigation on the water physical properties of pomegranate and its growth and productivity have not been sufficiently studied.

In the following years, there are opportunities to rapidly develop horticulture and fruit growing in all regions of the Republic of Uzbekistan, to increase productivity sharply, to improve quality, and in this way to provide the population with quality fruit products for food production enterprises. Fruit growing is the leading branch of agriculture. Today, the fruit area is about 148,000 hectares, and the annual gross fruit production is 1,821,000 tons, which cannot meet the demand for fruit products.

Experimental methods: Researches were carried out in field and laboratory conditions, in which, in field experiments, 4 varieties of pomegranate were planted in the scheme of 4x3 and 3x2, red pomegranate, red pomegranate, white grain (camel tooth), black grain, red pod (local – locally variety).

RESEARCH RESULTS

According to the results of scientific research, irrigation of pomegranate during the period of operation, especially when irrigation is carried out through ordinary direct irrigation, causes soil particles to break up under the influence of water flow and leave them out of the field with wastewater as sludge [4, 7, 8].

The main goal of the research is to establish the most effective methods of pomegranate irrigation, to ensure the increase of soil fertility and to obtain a high yield along with obtaining a high-quality product. It is important to obtain high yields of drought-resistant crops by providing low irrigation water in arid regions, including light-colored gravelly gray soils.

It is important to know the water requirements of crops in order to determine the irrigation regime of crops. In this case, taking into account the general need of crops, that is, knowing the process of transpiration and evaporation of water from the soil surface, it is possible to directly calculate the coefficient of water requirement of crops and the planned harvest. The coefficient of the plant's need for water depends on the rate of evaporation, humidity of the air, the climatic conditions of the place, the depth of underground and seepage water, and the temperature regime of the season, and indicates the amount of water used for growing 1 t of crops (m3/s).

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In our research conducted to study the irrigation regime of pomegranates in 5 hectares of the farm "Sun fruit Natural" of Fergana region, 4 hectares of the pomegranate orchards currently introduced to a total of 309 hectares in the pilot farm of the Pomegranate agro-firm, the total irrigation rate was 2700 m3/ha, 3000-4000 m3/ha in the second option, 3500-5500 m3/ha in the third option and 4800-6000 m3/ha in the fourth option.

It is important to use sprinkler irrigation technology in pomegranate irrigation. This, in turn, makes it possible to obtain a high yield and save water in the lands where underground water is far away (below 2-3 m).

In the field experiments, an experimental irrigation system was used to irrigate the crop area, including drip irrigation, odd rows along the furrows, even rows and half-moon surface irrigation methods.

An important factor determining the irrigation technique is the ability of the soil to absorb water. In turn, depending on the slope of the cultivated area and the soil structure, it is characterized by a tendency to absorb water of 20-50 mm/hour due to the high water absorption capacity of light sandy soils.

Due to the fact that the slope of the cultivated area is high (>0.01) in our experiment, the length of the ridge was 40-50 meters. In addition, in order to distribute water between rows of the garden, plastic neap paper and grass were used to ensure equal distribution of water to each row.

At the beginning of Egat, the plastic neap used for water distribution showed its effectiveness, because when the paper and grass aturf used for irrigation were used, the paper was torn, and the grass was covered by held grass, and the small particles added to the water through soil erosion were deposited on the grass, and the water level was reduced during the passage of water. . This situation causes non-uniformity of water consumption in the conducted experiments and an error of up to ±2-3%.

0.45–0.55 l/sec in 4/3 of the EGT. (90 cm); 0.35–0.40 (60 cm) l/sec. in the stream, then it is 0.12–0.22 l/sec. is reduced to 0.10-0.12 l/sec. it is necessary to reduce it to 1000 m, water should be continuously drained in alternating flow, irrigation should be carried out without leakage and it should be ensured that the soil is fully moistened along the entire length of the field.

Correct determination of irrigation norms and periods during the period of flowering and fruit ripening of pomegranates, if this is not followed, it will negatively affect the growth and development of pomegranates, leading to the loss of most of the crop. During the ripening period of pomegranate fruits, it is not recommended to carry out high watering, because the soil temperature will decrease.

Watering streams should be taken as deep as possible so that the streams are evenly moistened along their entire length. In order to supply the necessary water during the period of pomegranate harvest, the furrow depth should be 20-25 cm, 16-18 cm in 60 cm row spacing, 18-22 cm in 90 cm row spacing.

Otherwise, the water supply required for the pomegranate will not be sufficient, which in turn will have a negative effect on the development of the pomegranate plant. In order to gradually moisten the soil, it is considered to be purposeful to ensure constant drainage of water by filling each field along the entire field in an alternating flow, first more, then half, and finally, by forming irrigation water.

Since our main cultivated areas consist of a zone of pale stone-gravel gray soils, a large amount of water is

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consumed during the irrigation period of the pomegranate plant. Taking this into account, it is possible to obtain a high yield of pomegranate due to the use of economically convenient irrigation methods

CONCLUSION

0.45–0.55 l/sec in 4/3 of the field during the cultivation of pomegranate in the conditions of pale stone-gravel gray soils. (90 cm); 0.35–0.40 (60 cm) l/sec. in the stream, then it is 0.12–0.22 l/sec. is reduced to 0.10-0.12 l/sec. by reducing it to 10, the possibility of obtaining a high yield of pomegranate is created due to the fact that the water is constantly flowing in an alternating flow, irrigation is carried out without leakage. In addition, 10-20% saving in water consumption is achieved

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