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Requirements for the Formation and Irrigation of Irrigation Ditches between the Vine Row

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Abstract: Recently, in a number of farms, ok-aryks have been replaced by flexible nylon pipelines with a hole for releasing water near each furrow. To lay and assemble them, they use a special device that is mounted on tractors. The use of nylon pipelines is promising, and even necessary in vineyards planted on slopes. This method is also important when irrigating saline lands with high groundwater levels, as it avoids the removal of salts to the soil surface. As a last resort, turf (chim) is laid at the beginning of irrigation furrows. Labor costs for infiltration irrigation of a vineyard along furrows using siphons are less than when irrigating with chim.

Keywords: water, row spacing, irrigation, vineyard, winter, normal, usually, distances.

When infiltration irrigation is used between the rows of vineyards, irrigation furrows are cut with plows or chisels, along which water is released in a thin stream.

The number of furrows between rows depends on the distance between bushes, the age of the bushes, and the nature of the soil. In young, non-fruit-bearing vineyards, as well as in fruit-bearing vineyards with a row spacing of 2.5 m, two furrows are usually cut in each row spacing, at a distance of 40-50 cm from the row of bushes. In fruit-bearing vineyards with row spacing of 3 m or more, there are three furrows, the outer two furrows are at a distance of 40-50 cm from the row of bushes, the third is in the middle of the row spacing (Fig. 1). On pebble and sandy soils, three furrows are also cut at row spacings of 2.5 m. The distance between furrows for light permeable soils is 60 cm, medium - 80 cm and heavy - 100 cm.

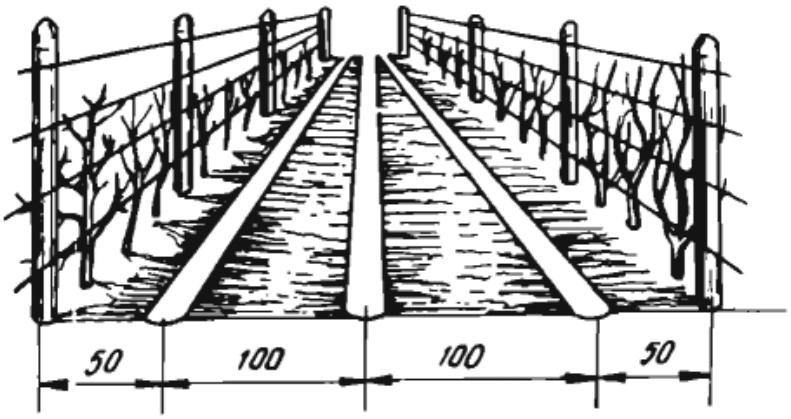

Fig.1 Watering grapes in three furrows with row spacing of 3 m

Infiltration irrigation requires a flat topography with a slight slope (0.002-0.008) along the direction of the irrigation furrows. The most favorable slope is considered to be 0.003-0.004.

With a slope of less than 0.002, water flows through the furrows too slowly, and with a slope of more than 0.008, soil erosion is possible. On loose, light, permeable soils, where water seeps in faster, the slope should be greater. As soil permeability decreases, the slope of irrigation furrows decreases.

The length of irrigation furrows should be adjusted to the length of the rows of vineyards. On cohesive soils with weak water permeability and large slopes, the length of the furrows can reach 300 m. On light, highly permeable soils, the length of the furrows is reduced to 100 m. An ok-aryk 25-30 cm deep is made across the rows of the vineyard along an intercellular road. Water from it flows into the irrigation furrows and moistens the soil. The depth of the irrigation furrows is 15-25 cm, in areas with a slight slope 20-25 cm, and on large slopes - 15-20 cm. With infiltration irrigation, water flows into each furrow in a small stream for a long time (12-24 and even 36 hours). At the beginning of watering, in order to moisten the furrow faster, the water stream is increased to 0.15-0.30 l/s. As soon as the water reaches the end of the furrow and wets its bottom, the stream is reduced to 0.05-0.15 l/s, depending on the slope. The longer infiltration irrigation is carried out, the deeper the soil is soaked.

The size of the stream coming from the ditch is regulated by installing a bridge at the beginning of the irrigation furrow.

A rubber or nylon hose (siphon) with a hole diameter of 1.5 cm is thrown over this jumper, through which water flows in a uniform stream into the irrigation furrow. Recently, in a number of farms, ok-aryks have been replaced by flexible nylon pipelines with a hole for releasing water near each furrow. To lay and assemble them, they use a special device that is mounted on tractors. The use of nylon pipelines is promising, and even necessary in vineyards planted on slopes. This method is also important when irrigating saline lands with high groundwater levels, as it avoids the removal of salts to the soil surface. As a last resort, turf (chim) is laid at the beginning of irrigation furrows. Labor costs for infiltration irrigation of a vineyard along furrows using siphons are less than when irrigating with chim.

When watering, make sure that the water does not flood the vineyard or erode the furrows. Water is passed along the furrow in such a way that it is completely absorbed into the soil and not discharged from the vineyard area (irrigation without discharge).

As soon as the soil dries, after each watering the irrigation furrows are loosened.

In main and inter-farm canals, in on-farm irrigation systems, 40-50% of water is lost to evaporation and seepage into the soil. To eliminate these huge losses, the bottom and walls of the canals began to be concreted and water was supplied to the vineyards through reinforced concrete trays. Shrubs are planted along the ditches to reduce the evaporation of water from the open surface. These activities are expensive, but they quickly pay off.

The number, timing and norms of irrigation are established differentially, taking into account irrigation purposes, soil and climatic conditions, age of plantings, groundwater level, depth of distribution of the root system of bushes, water balance in sources and method of irrigation, varietal characteristics and purpose of the grape harvest, agrotechnical measures, saving water in the soil, time and year conditions.

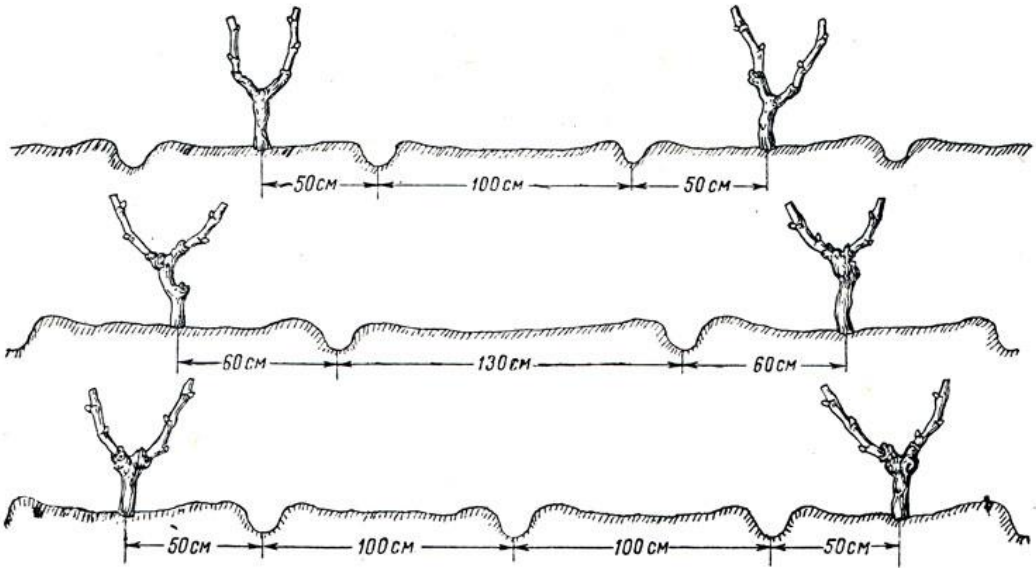

Fig.2. Layout of furrows in row spacing equal to 2; 2.5 and 3 m with infiltration irrigation

In severely arid areas, vineyards are watered more often and at higher rates than in less arid areas. On light, permeable soils, watering is carried out more often, but irrigation rates are less than on heavy soils. In vineyards with groundwater close to the surface, the number of irrigations and irrigation rates are less than in soils with deep groundwater. In areas with highly mineralized groundwater close to the surface, care must be taken to ensure that harmful salts do not rise into the upper root-inhabited soil horizons.

To do this, you should not allow the soil to become waterlogged and water to penetrate into the saline layers. If necessary, rinsing irrigation is used here.

In Uzbekistan, on grey-earth loamy soils, high yields of good quality grapes are obtained with soil moisture: in the first half of the growing season 70-80% of the field moisture capacity (MC), in the second - 60-65% MC to a depth of at least 1 m. Special experiments, carried out in Samarkand (Sh. N. Nigmatov, V. I. Gorbach), it was found that with pre-irrigation soil moisture of 40% of the field moisture capacity, plants feel depressed and produce a very low yield.

Moisture-recharging irrigation is carried out during the non-growing season from November to March in order to accumulate a supply of moisture at great depths by the beginning of the growing season. Moisture-recharging irrigation (winter) with soil soaking up to two meters can reduce the number of vegetation irrigations by 1-2. On gray soils, two moisture-recharging irrigations are given, on pebble soils - two or three. Their irrigation rate is greater than that of the growing season when groundwater is deep (1200-1500 m3/ha); on light pebble soils it is less so that soil moisture at a depth of 150 cm reaches 100% of the PV.

In areas of covered viticulture, moisture-recharging irrigation is carried out by pouring water into the rows so that the covered bushes do not flood. In areas with high standing fresh groundwater, moisture-recharging irrigation is unnecessary.

Washing of saline soils is also carried out during the non-growing season with an increased irrigation rate.

Vegetative irrigation for fruit-bearing vineyards on heavy clay soils is 700-900 m3/ha, on light loamy soils - 600-700, on sandy soils and pebbles - 400-500 m3/ha. Young vineyards require more frequent watering, but a lower irrigation rate of 350-500 m3/ha, since in the first years of planting the root system of the grapes is shallow.

Vineyards are given 8 waterings per year of planting: the first watering after planting and then one in April and May, two in June, July and August. In the second or third year after planting,

water 6-8 times. On lands with close groundwater levels, the number of irrigations is reduced to two to four; on pebble soils, it is increased to 15-18.

During the growing season, fruit-bearing vineyards receive three to four waterings on heavy soils and 7-8 times on soils with weak water-holding capacity - sandy, pebble.

On saline soils with close groundwater levels, irrigation is carried out in such a way as not to cause the connection of irrigation water with groundwater, as this will lead to the rise of salts from the lower soil horizons to the upper ones and cause oppression of the bushes.

On meadow soils with high groundwater levels, vineyards receive two or three waterings, and sometimes they are content with ground moisture.

In rain-fed vineyards, deep autumn plowing and loosening of the soil after rainfall are carried out to accumulate precipitation in the soil.

At the Bulungur state farm No. 1 in the Samarkand region, a unique method of watering fruit-bearing vineyards is being tested. The first time the vineyards are watered along two furrows made by passing the PRVN-2.5A plow. As soon as the soil in the furrows dries, the same plow is used to plow the rows in a waddling manner, closing the furrows. The moisture in the soil is covered with a thick layer of earth. At the same time, one furrow is opened in the middle of the row for subsequent watering. When watering, the middle furrow is plowed, opening these two furrows near the rows of grapes for subsequent watering. This irrigation system should be widely tested, especially in water-scarce areas.

The experience of watering a vineyard at the Ogonyok state farm, located in the valley of the river, is also interesting. Chirchik (Tashkent region). As a result of floods on the river in May - July, groundwater here rises to 2 m from the soil surface. In the summer, the vineyard on the state farm is not watered, since groundwater reliably feeds the root system of the plants. In December - February, when the groundwater runs deep, the vineyards are given two abundant (up to 1500 m3/ha of water) water-recharging irrigations.

Grapes under these conditions produce high yields. To retain moisture, after watering, as soon as the soil dries out, the irrigation furrows are loosened to a depth of 12-14 cm. Moisture penetrates better into loose soil during the next watering. If the soil is not loosened, then a crust and cracks form on it, and after a week it dries out very much.

In the northern regions of the republic, vegetation irrigation ends by September 1, in the southern regions by September 10-15. To improve the quality of grapes, they are stopped 15-20 days before harvesting. For table varieties and varieties used for making dessert wines, it is advisable to stop watering 25-30 days before the grape harvest.

Dry soil does not cover the bushes well for the winter and they may suffer from frost. Therefore, before covering the vineyards for the winter, light watering is done with a water flow of 200-250 m3/ha. Watering is stopped in case of precipitation.

In foothill areas with hilly terrain, to retain moisture from atmospheric precipitation, in addition to autumn plowing and loosening the soil after rain, earthen rollers are placed between the rows of vineyards. They are made across the slope, every 10-15 m, 20-30 cm high and 30-40 cm wide at the base. The soil is plowed across the slope to retain runoff.

Fertilizer is one of the main means of increasing grape yield. Growing in one place for many years, a grape bush removes a significant amount of nutrients from the soil. According to the Scientific and Production Association of Fruit Growing, Viticulture and Winemaking named after. R.R. Schroeder, with a harvest of 200-300 c/ha, the removal of nutrients by annual growth and harvest is: nitrogen 90-105 kg, phosphorus 40-50 kg and potassium 200-300 kg. A large removal of nutrients occurs due to leaves, then berries, pruned shoots, and less due to green shoots (fragment, chasing, etc.). The vineyard consumes the bulk of nutrients from the beginning of shoot growth to the ripening of berries. Therefore, grapes are responsive to fertilizers, when applied the increase in yield reaches 40% or more.

The quality of the grapes changes depending on the fertilizers. For example, excessive application of nitrogen delays the ripening of shoots and crops, complicates the clarification of wine and reduces its quality. The addition of potassium increases the sugar content and aromaticity of the berries.

The most common organic fertilizers are manure, garden compost, and waste from the wine industry (combs, marc, seeds). The waste is sprinkled with mineral fertilizers at the rate of: per 100 kg of marc, 3-4 kg of superphosphate and 2 kg of potassium chloride. This mixture is poured with 15 liters of a solution of lime and ammonium sulfate (1 kg of quicklime and 2 kg of ammonium sulfate per 100 liters of water). The mass prepared in this way is placed in trenches and covered with a 5-10 cm layer of earth. After 30-35 days, when the mass has rotted, it is shoveled. After some time, stirring is repeated. After two to three months, the resulting compost is used for application to the vineyards.

Green fertilizer has a positive effect on grape plantings. For the uncovered viticulture zone, August-September sowing of Nicholson peas, shabdar and some other legumes through the rows is used as green fertilizer. In the spring, in May, during the flowering period, green manure is plowed to a depth of 25-30 cm, and manure and compost are added to the row spaces free from them.

Mineral fertilizers include nitrogen, phosphorus and potassium, as well as microfertilizers - boron, manganese, zinc, copper, molybdenum, etc. All soils in Uzbekistan require nitrogen fertilizers. Meadow soils, then gray soils, are especially responsive to phosphorus fertilizers, and pebble, sandy and soils with high groundwater levels are particularly responsive to potassium fertilizers. On saline soils, potassium must be added carefully so as not to increase the concentration of the soil solution (especially in areas with chlorine and magnesium salinity).

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