

## Scientific Benefits and Efficiency of Drip Irrigation

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### Abstract

The article provides detailed information about the drip irrigation system. It has been shown that the drip irrigation method can be used for efficient and water-saving irrigation of various plants, which is comparable to other resource-efficient irrigation systems.

**Keywords:** drip irrigation, drip irrigation system, plants, water saving, use for irrigation, resource saving irrigation systems, irrigation field, weeds, drip hose

What is drip irrigation? The drip irrigation system consists of an irrigation source, filter and pump, pressure regulator, main and distribution pipes, equipment for melting and preparation of fertilizers (hydraulic feeder) and drip irrigation pipes. Water for irrigation is mainly supplied under a pressure of 0.07-0.28 MPa or under low pressure by its own flow. Low pressure is created by the difference between the surface height and the water level at the source.

What are its advantages and what types of this technology are available. With drip irrigation, the root systems are better developed than with any other irrigation method, and they are densely located near the drip irrigation. When using drip irrigation instead of other irrigation methods, the root system quickly and actively gets used to it.

Drip irrigation has the following capabilities:

- Fast and rapid assimilation of nutrients due to good aeration of the soil and active development of the root system around the dropper;
- Possibility of irrigation at any interval, regardless of field work in the irrigated field;
- Due to the dry row spacing during the season, soil cultivation and harvesting can be carried out without affecting the soil structure, regardless of watering.

Drip Irrigation Benefits:

- a. Obtaining high yields with low water consumption per unit of production;
- b. low water consumption for evaporation in comparison with surface or rainwater irrigation;
- c. The wind does not affect the spread or evaporation of moisture;

- d. Slow absorption and distribution of irrigation water in the soil, even in difficult terrain conditions, no water flow in other directions is observed.
- e. Irrigation can be carried out within 24 hours regardless of external conditions (wind speed and evaporation);
- f. There are fewer weeds than with other irrigation methods;
- g. crops ripen earlier due to higher soil temperatures with drip irrigation than with rain and surface irrigation;
- h. Fertilizers can be applied to the layer where the plant roots are located through a drip irrigation system;
- i. As a result of the shortening of the inter-irrigation period, the "stress" state of the plants is reduced. The interval between watering is 1 - 3 days.

At first glance, everything is simple: but in reality it is not. The further these holes are from the starting point of the pipe, the less water there is. It's something like: "Somewhere lim-lim, somewhere quiet." The problem of supplying water along the entire length of the pipe, in exactly the required amount, has been solved. Drip irrigation is the transfer of water and nutrients necessary for the plant to the area where each plant is located, which allows to ensure the optimal water-physical and nutritional regime of the soil.

To date, many types of drip structures have been created, which make it possible to irrigate plants in the same amount and in a specified amount. This method of irrigation, in turn, is the main advantage of irrigation, it provides an optimal level of moisture in the soil layer in which the roots of plants are located, and the absence of an increase in soil moisture during irrigation and minimal drying out of the soil on the site. the end of the inter-irrigation period.

The constant maintenance of moisture in the soil without overheating is good aeration, and in vineyards with irrigation, water is hung on the lowest cable in the trellis. After the nozzle-fitting is installed in the distribution pipe, a drip hose, routed along the edge, is connected to it and secured with a nozzle nut. The drip hose must not be tightened. The ends of the wand and drip hoses are closed with plugs, or the pipe or hose is bent and tied.

Before starting the drip irrigation systems are thoroughly rinsed. To do this, the plugs at the ends of pipes and hoses are removed and opened before water is supplied to the system. After opening the distribution unit of the first module and rinsing the distribution pipe under pressure, its end is closed with a plug (plug). In this case, water flows to the drip hoses and begins to flow out of them 3-5 min from water hoses. after a leak, their ends are alternately closed in the working position. After that, all areas where water flows are closed. The pressure in the system is measured after thoroughly flushing the module and checking for water leaks: a plug is removed from the end of each drip hose and replaced with a pressure gauge with a scale division of 0.05 kg / cm<sup>2</sup>. The manometer readings are recorded in a notebook. In this case, the pressure in the hoses of the module should not differ by more than 5%. If necessary, the pressure in each hose of the drip irrigation system is adjusted by changing the diameter of the fittings. Pressure adjustments usually start with the farthest hose. The rest of the drip irrigation system modules undergo similar checks and settings.

When using drip irrigation systems, the main emphasis is on its tightness, and it is constantly checked. If water leaks from anywhere in the system, it should be eliminated immediately. Otherwise, water and fertilizer will not be evenly supplied to all points of the field.

Drip irrigation systems should be washed and cleaned twice a month. For this, the plugs at the ends of the hoses are opened for 3-4 seconds, respectively. To dissolve the hardened salts in the hoses of the system and remove sticky algae, a 0.5% solution of nitric acid is introduced into pipes and hoses 1-2 times during the season and for 15-20 s. then each module is rinsed with clean water. At the end of the season, the system is treated with a 2-3% solution of nitric acid, and the drip hoses are separated from the nozzles and replaced with plugs.

Drip hoses are collected from the field and treated with 1-3% hydrochloric acid solution before being placed in warehouses. All beard taps in the system remain open during the off-season and are thoroughly washed before the season.

Drip irrigation has become the only selective irrigation method in agriculture in countries with harsh climates and limited water resources. Since Korea is one such country, extensive research has been done on this irrigation method. The country began to use these irrigation methods on an industrial scale. Thanks to the same drip irrigation method previously used by the fast-growing semi-starvation food card method the country of sale for several years has become a major exporter of agricultural products.

Since the 1960 s, farmers around the world have found that drip irrigation can increase crop yields, lower tillage costs, and save water. By the 1980 s, drip irrigation had become more common in countries around the world, regardless of irrigation options. In today's market of drip irrigation, drip irrigation equipment is widely used in agriculture, as well as in landscaping and in private backyards and household plots.

The efficiency of droppers is determined in liters / hour, that is, it is determined by how much water is taken from one dropper per hour. Typically, the drip capacity is one to four liters of water per hour. The technology of drip preparation is so perfect that the flow rate of water through each individual dripper in an aquifer about 100 m long does not exceed 5-10%.

Additional benefits of drip irrigation systems include the ability to irrigate even larger areas than conventional irrigation. This is especially important if your water source has limited capacity and this method also allows watering in low water pressure conditions. For example, sprinklers can spray water well with a pressure of 1.5 to 2.0 atmospheres. Drip irrigation devices can work comfortably even at a pressure of 0.3 - 0.5 atmospheres.

What we have described about the drip irrigation system shows that this method can be used to irrigate a variety of plants efficiently and water-efficiently.

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