

Khodjaeva Nodira Odilovna

*Andijan Institute of Agriculture and agrotechnology, independent researcher.*

**Abstract:** *In this article, the agrotechnical measures carried out during the plant's period of cultivation of Tamaris, Vilana and Slavia soybean varieties, irrigation methods and procedures in all options, by the end of the soybean period, the volume mass of the soil increased to 0.023-0.032 g/cm<sup>3</sup> in the areas where the varieties were cultivated, and the porosity was 0. It is highlighted that it decreased to 9-1.2%.*

**Key words:** *irrigation methods, volume mass, porosity, soybean varieties, drip irrigation method, irrigation using flexible pipes, horizontal irrigation.*

## INTRODUCTION

Global soybean market is growing reliably due to increasing demand for livestock, biodiesel and food products. Over the past decade, total soybean production has increased by 46.1 percent to reach 352 million tons by 2021. Currently, the increase in the production weight of soy products is provided by increasing the cultivated area or increasing the yield.

Paragraph 6 of the Decree of the President of the Republic of Uzbekistan dated October 23, 2019 No. PF-5853 "On approval of the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030" states that "...environmental protection, increasing soil fertility and introduction of water-saving technologies to achieve" are defined as important strategic tasks. In the current conditions of scarce water resources, saving water in irrigation of repeated crops, reducing the wastage of water and effective use of irrigation water is an urgent task, which this research serves to illuminate to a certain extent. [1]

**Literature review.** In the course of our scientific researches, we got acquainted with the scientific researches of several foreign and domestic scientists. In particular, American scientists N.M. Taylor, H.B. Cardner came to the conclusion that a very high-volume mass of the soil has a negative effect on the aeration process in the soil, and as a result, the plant root cannot develop freely, and the plant stops growing. In the studies carried out by U. Nematov, at the end of the period of operation of the plant, the volume mass of the soil was 1.39-1.40 g/cm<sup>3</sup>, and when irrigation was carried out by the method of irrigation, these indicators were 1.37-1.39 g/cm<sup>3</sup>, it was determined that the volume mass of the soil is less by 0.02-0.01 g/cm<sup>3</sup> compared to the watered one. According to B. Khalikov, N. Yodgorov, O'. Mahmudov, in the conditions of irrigated light-colored gray soils of Kashkadarya region, the volume mass of the soil was reduced to 0.012 g/cm<sup>3</sup> due to the root and root residues remaining in the soil as a result of the cultivation of peanuts, soybeans and mung bean crops as a repeated crop after winter wheat. highlighted. [3,4,5]

**Materials and methods.** The research was conducted in 2020-2022 on the basis of an experimental system in the cultivation of soybean varieties Vilana, Slavia and Tamaris as a repeated crop after winter wheat. (Table 1).

Table 1

**Experience system**

No	Irrigation methods	Pre-irrigation moisture in relation to S, %	soil in relation to Number of irrigations, times	of Calculation layers to be thinned, cm
<b>Tamaris variety</b>				
1	Furrow Irrigation (Control)	70-75-65	1-1-1	50-70-50
2	Irrigation using a flexible pipe	70-75-65	1-1-1	50-70-50
3	Drip irrigation	70-80-70	2-7-2	30-50-50
<b>Vilana variety</b>				
4	Furrow Irrigation (Control)	70-75-65	1-1-1	50-70-50
5	Irrigation using a flexible pipe	70-75-65	1-1-1	50-70-50
6	Drip irrigation	70-80-70	2-7-2	30-50-50
<b>Slavia variety</b>				
7	Furrow Irrigation (Control)	70-75-65	1-1-1	50-70-50
8	Irrigation using a flexible pipe	70-75-65	1-1-1	50-70-50
9	Drip irrigation	70-80-70	2-7-2	30-50-50

Research was conducted on the impact of various irrigation methods and patterns on the bulk density and porosity of the soil in the cultivation of soybean varieties as repeated crops. Soil samples were taken from each experimental variant at the beginning and end of the growth period at depths of 0-10, 10-20, 20-30, 30-40, and 40-50 cm, using a cylinder (volume 500 cm<sup>3</sup>) for analysis, determined by N.A. Kachinsky's method. [2]

**Results and Discussion.** Our studies showed that at the beginning of the growth period in 2020, the bulk density of the soil was 1.335 g/cm<sup>3</sup> at 0-30 cm and 1.39 g/cm<sup>3</sup> at 30-50 cm, while porosity in these layers was 50.60% and 48.5%, respectively. In cultivating the local Tamaris variety of soybean with irrigation set at 70-75-65% relative to Marginal field wet capacity, the conventional irrigation method (variant 1) involved three irrigations with a seasonal irrigation rate of 2171.8 m<sup>3</sup>/ha. By the end of the growth period, the bulk density increased by 0.04 g/cm<sup>3</sup> in the upper layer (0-30 cm) and 0.024 g/cm<sup>3</sup> in the lower layer (30-50 cm), with a corresponding decrease in porosity of approximately 0.9-1.5%. In variant 2, where irrigation was conducted using flexible pipes with a moisture level of 70-75-65%, the seasonal irrigation rate was 5% less than the control variant, with bulk density increasing by 0.033-0.082 g/cm<sup>3</sup> and porosity decreasing by 1-1.3%. In variant 3, where drip irrigation was applied at the same moisture level, there was a 37.2-40.3% savings in water compared to the previous methods, with bulk density increasing by 0.007-0.009 g/cm<sup>3</sup> and porosity decreasing by 0.3-0.4%.

When the irrigation of soybean imported from foreign countries is 70-75-65% relative to the moisture capacity, the number of irrigations is 3 times in the 4th variant irrigated in the traditional way, and the seasonal irrigation rate is 40,3 m<sup>3</sup>/ha compared to the traditional irrigated variant of the domestic Tamaris soybean variety. It is known that it consumed a lot of water until the end of the plant's period of operation, it was observed

that the bulk mass of the soil in plowed and under-plowed layers increases to 0.037-0.021 g/cm<sup>3</sup>, and porosity decreases proportionally to 1.4-0.8% according to the layers. In the maintenance of this variety of soybean, the soil moisture before irrigation was 70-75-65% relative to Marginal field wet capacity, in the 5th option, which was irrigated 3 times in the 1-1-1 system with the help of flexible pipes, it was observed that the seasonal irrigation rate was saved up to 8.3% compared to the control option 4 and the volume mass of the soil increased to 0.032-0.014 g/cm<sup>3</sup>, densification, and porosity was observed to decrease to 1.2-1.3%. Irrigation in the maintenance of Soybeans' Vilana variety was 70-80-70% relative to the moisture capacity, 2-7 In the 2nd system, in the 6th option, which is carried out using the drip irrigation method, the seasonal irrigation rate of soybeans is 35.8-41.1% water saving compared to the 4th and 5th options. It was found that it increased to 0.004-0.006 g/cm<sup>3</sup>, and the porosity decreased to 0.2%.

In the maintenance of the Slavia variety of soybean imported from foreign countries, irrigation is 70-75-65% relative to Marginal field wet capacity, the number of irrigations in the 1-1-1 system is 3 times in the traditional way, in the 7th option, the seasonal irrigation rate is 88.5 m<sup>3</sup>/ha, compared to the option of irrigating the Tamaris variety of soybean consumed a lot of water, and by the end of the plant's period of operation, compared to the initial state, the bulk mass of the soil in the plowed and under-ploughed layers increased to 0.041-0.030 g/cm<sup>3</sup>, and the porosity decreased to 1.6-1.1%, irrigation relative to Marginal field wet capacity in the order of 70-75-65% in the order of 70-75-65%, in the 8th option, which is irrigated using flexible pipes, the amount of seasonal water consumption is 145.8 m<sup>3</sup>/ha compared to the 7th option, and by the end of the plant's operational period, the soil in the plowed and under-ploughed layers compared to the initial state it was observed that the volume increases the mass to 0.036-0.024 g/cm<sup>3</sup>, and the porosity decreases to 1.4-1%. Irrigation is 70-80-70% relative to Marginal field wet capacity, irrigation in the 2-7-2 system is carried out using the drip irrigation method. 8-var), it was found that water was saved up to 37.5%, volume mass increased to 0.011-0.013 g/cm<sup>3</sup>, and porosity decreased to 0.5% compared to the initial state (Fig. 1).

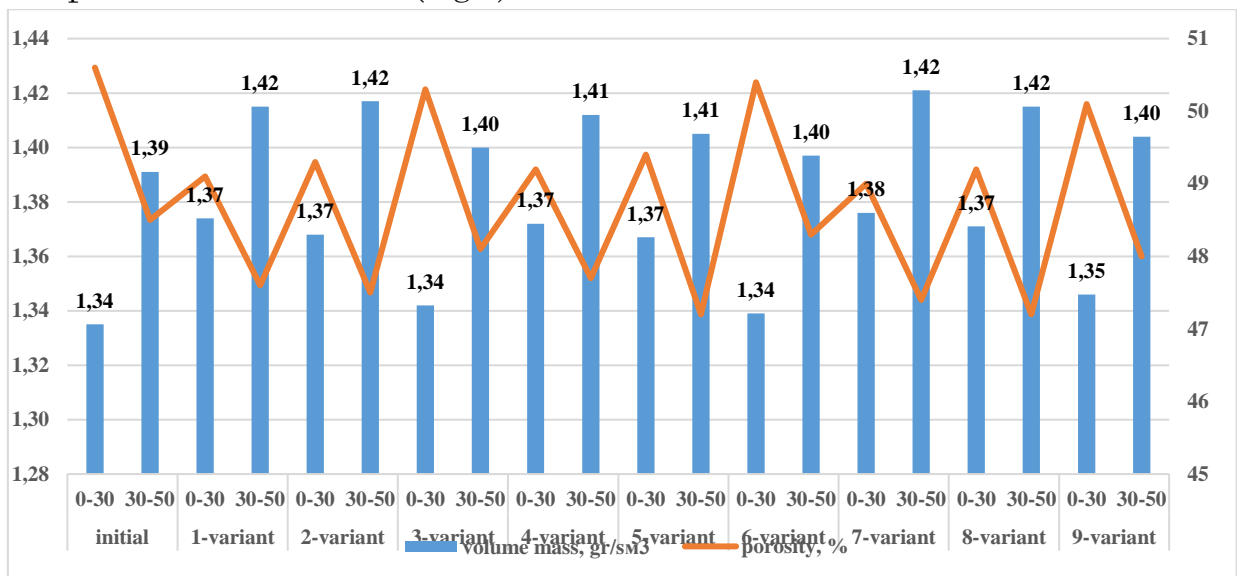


Figure 1. Effects of different methods of irrigation on soil volume and porosity in soybean cultivation as a recurrent crop (2020)

In the course of our researches, it was observed that by the end of the period of soybean, the bulk mass of the soil increases and the porosity of the soil decreases.

According to the results of our research conducted in 2020-2022, the pre-irrigation soil moisture of 70-80-70% relative to Marginal field wet capacity in the care of Tamaris, Vilana and Slavia varieties of soybeans, as a result of the drip irrigation method, compared to our conventional and flexible pipe options. 4.2-6.2 centers of additional grain yield were obtained. (Figure. 2)

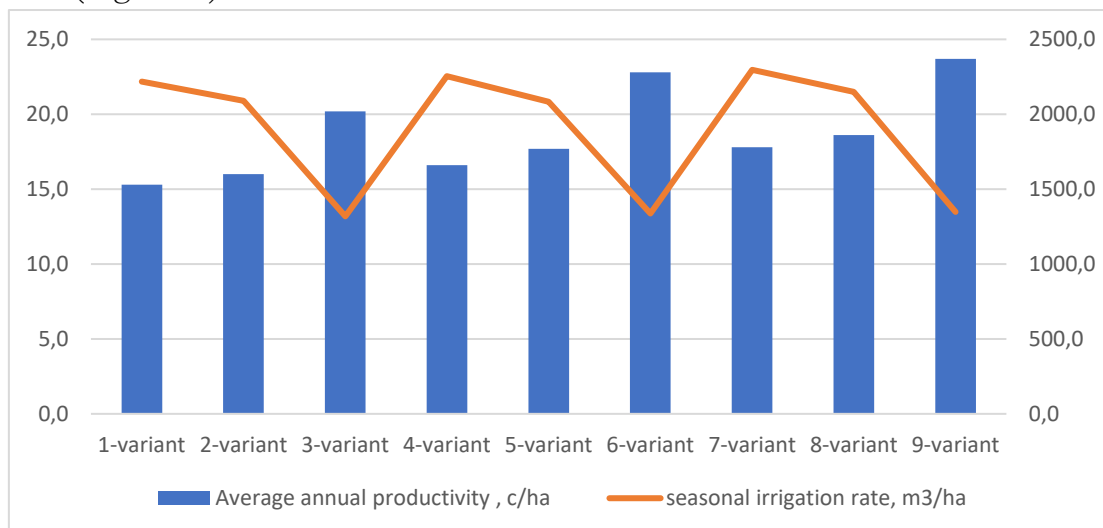


Figure 2. Average seasonal irrigation rates of soybean varieties, m<sup>3</sup>/ha and productivity in c/ha.

**In conclusion**, in our research, it was observed that there is almost no significant difference in the amount of seasonal irrigation water between domestic and foreign soybean varieties, but there is a sharp difference in terms of irrigation methods in crop maintenance. When the drip irrigation method is used in the maintenance of soybean varieties, the amount of seasonal water is up to 40.3-41.1-41.6%, compared to irrigation with a flexible pipe, up to 37.2-35.8-37.5%, depending on the variety. was observed and when irrigation was carried out in the order of 70-80-70% in relative to Marginal field wet capacity, on the basis of the drip irrigation method, the volume mass of the soil in the driving layer (0-30 cm) was 0.026-0.032 g/cm<sup>3</sup> in the cultivated field of Tamaris variety compared to the variants irrigated with the help of conventional and flexible pipes, the Vilana variety decreased to 0.023-0.033 g/cm<sup>3</sup>, and the Slavia variety decreased to 0.025-0.030 g/cm<sup>3</sup>, and the porosity was 1.0-1.2, according to the varieties; 1-1.2; An increase of 0.9-1.1% is achieved, which is explained by the use of resource-efficient irrigation methods, which cause water to fall directly under the seedlings and reduce the irrigation rate.

#### REFERENCES:

1. Decree No. PF-5853 of October 23, 2019 of the President of the Republic of Uzbekistan "On approval of the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030"
2. Methods of conducting field experiments. Tashkent-2007.

3. Nematov U. "Effect of Soybean Cultivation on Soil Bulk Mass". "Agro ilm" scientific supplement of the agricultural journal of Uzbekistan. Tashkent, 2017, No. 2. -b. 35.
4. Khalikov B., Yodgorov N., Mahmudov O'. Effect of intercropping of peanut, soybean and mung bean on soil bulk mass. Agro science.2 [58] 2019. B.66-67
5. Taylor H.M., Cardner H.B. Penet ration of cotton toprooteas influenced by dusk density, biostructure and strain of soybean Soil Science, 2009, V. 96, -p.153.