THE IMPACT OF IRRIGATION METHODS ON THE GROWTH AND DEVELOPMENT OF SHADE-TOLERANT CROP VARIETIES.

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ВЛИЯНИЕ МЕТОДОВ ОРОШЕНИЯ НА РОСТ И РАЗВИТИЕ ТЕНЕВЫНОСЛИВЫХ СОРТОВ СЕЛЬСКОХОЗЯЙСТВЕННЫХ КУЛЬТУР.

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Abstract. This article highlights that when cultivating Vilana and Slavia soybean varieties using resource-efficient irrigation methods (TSU), the plant's stem height increased by 0.9–6.1 cm compared to conventional methods. Additionally, seasonal irrigation norms were reduced by 917.7–962.2 m³/ha compared to traditional irrigation and by 750.3–806.2 m³/ha compared to irrigation using flexible pipes.

Keywords: irrigation methods, stem height, TSU, soybean varieties, drip irrigation technology, irrigation with flexible pipes, furrow irrigation.

Аннотация. В данной статье освещается, что при выращивании сортов сои Вилана и Славия с использованием ресурсосберегающих методов орошения (TSU) высота стебля растения увеличилась на 0,9–6,1 см по сравнению с традиционными методами. Кроме того, сезонные нормы полива сократились на 917,7–962,2 м³/га по сравнению с обычным орошением и на 750,3–806,2 м³/га по сравнению с орошением с использованием гибких труб.

Ключевые слова: методы орошения, высота стебля, TSU, сорта сои, технология капельного орошения, орошение гибкими трубами, бороздовой полив.

Today, the growing global population is increasing the demand for food, including plant-based oil products. Meeting the global market's demand for soybeans and soybean oil is being achieved by increasing productivity without expanding cultivated areas. In many countries, the growing water scarcity problem in agricultural production makes it crucial to adopt resource-efficient irrigation technologies to cultivate high-yielding, high-quality, and cost-effective leguminous crops. Determining the appropriate irrigation methods, rates, and schedules, as well as identifying optimal irrigation techniques and water consumption for cultivating new soybean varieties as a secondary crop, is of paramount importance.

In this regard, foreign researchers such as G. Balakai, V. Borodychev, M. Lytov, R. Lavrienko, A. Babich, A. Kuzin, V. Melikhov, E. Ushakova, O. Belik, and M. Lgov, as well as domestic scientists like Kh. Atabaeva, D. Yormatova, A. Shamsiev, U. Norqulov, N. Khalilov, S. Isaev, I. Israilov, U. Ne'matov, M. Mannopova, M. Sattorov, A. Iminov, O. Sottorov, S. Khusanov, and J. Eshonqulov, have conducted extensive research on soybean cultivation and irrigation methods, both as a primary and secondary crop. However, despite these studies, there is still insufficient scientific research on developing optimal irrigation methods and schedules for cultivating soybean varieties as a secondary crop after winter wheat, especially under the anticipated water scarcity conditions not only in our country but also worldwide.

Research by our national scientists A. Muminov, A. Abduazimov, and N. Mirzaev has shown that when cultivating the To‘maris soybean variety as a secondary crop without nitrogen fertilizer application, the average weight of 1000 seeds was 135.1 g. When nitrogen fertilizer was applied at a rate of 60 kg/ha, the weight increased to 137.5 g, and at 90 kg/ha, it reached 141 g. Additionally, the protein content was found to be 42.3%, while the oil content was 25.5%. [3,4]

In studies conducted by N. Umarova and D. Mamataliev, it was observed that as the seeding rate of the Orzu and Uzbek-6 soybean varieties increased

(300,000–400,000–500,000 plants/ha), plant height also increased (63–67–71 cm). Seed yield varied depending on planting density: for the Orzu variety, it was 18.0–20.5–24.5 quintals/ha, while for the Uzbek-6 variety, it was 21.2–24.5–23.0 quintals/ha. [4]

From the above findings, it can be concluded that both seasonal irrigation rates and the number of irrigations influence plant height.

The research was conducted in the conditions of light sierozem, medium-heavy loamy soils at the "Oq Suv" experimental farm in Qo‘rg‘ontepa district, Andijan region. The experiment consisted of 9 variants arranged in a single-layer design, with each variant planted in 8 rows. The total experimental area was 720 m², while the accounting area was 360 m².

In the research, plant biometric measurements, laboratory analyses of soil and plant samples, phenological observations "Methods of Conducting Field Experiments", methods for determining protein content in soybean seeds "Methods for Determining Protein Content in Grain and Its Components", and data obtained from research results were mathematically and statistically analyzed according to B.A. Dospekhov's "Methodology of Field Experiment". Phenological observations on the growth, development, and yield of soybean varieties were conducted monthly on the 1st day from 100 labeled plants in each experimental variant and replication. [1]

According to the experimental results, for the Vilana soybean variety introduced from foreign countries:

- In variant 4 with conventional irrigation method where pre-irrigation soil moisture was 70-75-65% of FC and seasonal irrigation norm was 2306.6 m3/ha, plant height was determined to be 90.9 cm.
- In variant 5 with flexible pipe irrigation where pre-irrigation soil moisture was 70-75-65% of FC, 183.5 m3/ha less water was used compared to conventional irrigation (variant 4), and plant height was 91.6 cm.

- In variant 6 with drip irrigation technology where pre-irrigation soil moisture was 70-80-70% of FC, 933.8 m3/ha of water was saved compared to conventional irrigation (variant 4), and plant height was determined to be 93.7 cm. (Figure 1)

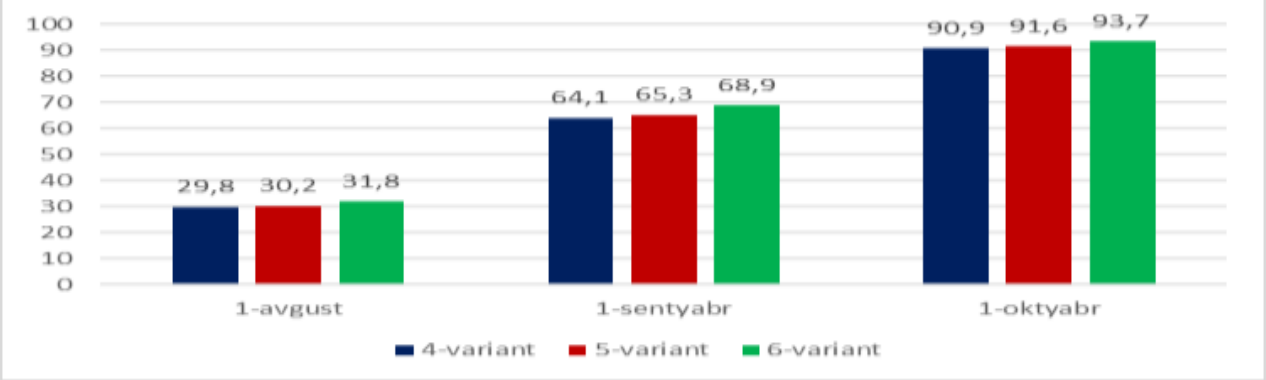

Figure 1. The effect of resource-saving irrigation methods on stem height of soybean Vilana variety.

In our research conducted on the Slavia soybean variety introduced from foreign countries at our experimental field, when cultivating plants with pre-irrigation soil moisture of 70-75-65% of FC, under conventional method with 1-1-1 system and 3 irrigations, where seasonal irrigation norm was 2342.7 m3/ha in variant 7, the plant's stem height reached 91.8 cm as of October 1. In variant 8 with pre-irrigation soil moisture of 70-75-65% of FC, irrigated 3 times with 1-1-1 system using flexible pipes, seasonal water amount saved 156 m3/ha compared to conventionally irrigated variant 7, and plant's stem height equaled 93.3 cm. For the same variety, in variant 9 with pre-irrigation soil moisture of 70-80-70% of FC, irrigated 11 times with 2-7-2 system using drip irrigation technology, seasonal irrigation norm saved 806.2 m3/ha of water compared to the variant irrigated with flexible pipes, and plant's stem height equaled 94.2 cm, which was determined in our conducted phenological observations (Figure 2).

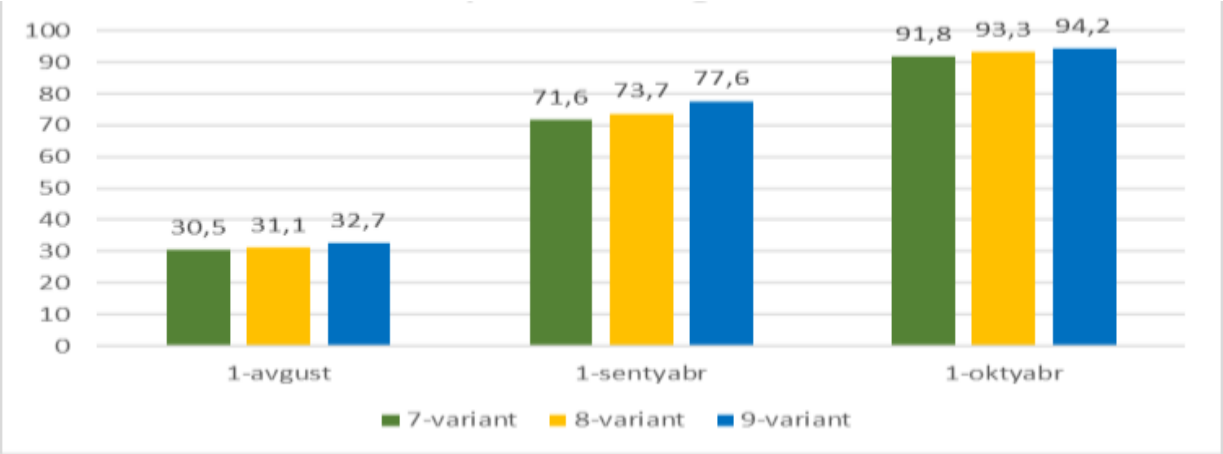

Figure 2. The effect of resource-saving irrigation methods on stem height of soybean Slavia variety.

In conclusion, it should be emphasized that when cultivating Vilana and Slavia soybean varieties with pre-irrigation soil moisture at 70-80-70% of FC using drip irrigation technology:

- Seasonal irrigation norms saved 917.7-962.2 m³/ha compared to conventional irrigation methods
- Water savings reached 750.3-806.2 m³/ha compared to irrigation with flexible pipes
- Plant stem height increased by 0.9-6.1 cm

REFERENCES

1. Methods of Conducting Field Experiments. Tashkent, 2007. 120 p. (In Uzbek)

2. Mirzaev N.N., Abduazimov A.A. Effect of Nitrogen Fertilizers on 1000-Seed Weight of Soybean Varieties // Collection of Scientific Articles of the Republican Scientific-Practical Conference "Role of Youth in Agricultural Science". In 2 vols. Vol. 1. Tashkent, August 14-15, 2020. P. 211. (In Uzbek)

3. Muminov A.A., Abduazimov A.M., Mirzaev N.F. Cultivation of High-Protein and High-Oil Soybean Varieties in Southern Regions // Prospects of New Cereal and Legume Varieties in the Republic of Uzbekistan, Introduction of Foreign Varieties and Modern Resource-Saving Cultivation Technologies:

Materials of the Scientific Conference. Andijan, May 21-22, 2019. P. 383. (In Uzbek)

4. Umarova N.S., Mamataliev D.M. Effect of Planting Density on Yield of Soybean Varieties // Problems of Creation, Efficient Use and Maintenance of Resource-Saving Machinery Technologies in Agriculture and Transport: Collection of Materials of the Republican Scientific-Practical Conference. Karshi, 2015. Pp. 182-184. (In Uzbek)