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PRE-IRRIGATION SOIL MOISTURE OF INDIGOFERA

Yodgorov Normumin G'ulomovich

Doctor of Agricultural Sciences, Karshi State Technical University. ORCID: 0000-0003-4716-9981

Amirqulova Nigora Baxriddinovna

Basic Doctoral Student, Karshi State Technical University. ORCID: 0009-0007-1896-7585

Abstract: *In the article, the issue of the effect of the timing of irrigation and the level of pre-irrigation soil moisture on the growth of indigofera planted at different times is examined. It was determined that the determination of the correct irrigation regime based on the needs of the plant and the maintenance of the required level of soil moisture greatly increases the yield of indigofera.*

INTRODUCTION

The determination of the correct irrigation regime is based on the conditions of the soil and the climate, the type of crop, and the stages of its growth. During the active stages of growth, such as the period of flowering, fruiting, and the formation of seeds, the lack of water sharply reduces the yield.

Irrigation regimes that do not correspond to the needs of the crop and the use of excess water damage the air space in the soil, the activity of the roots, and accelerate the salinization processes in the soil. Thus, it is necessary to strictly regulate the volume of irrigation based on the results obtained from the application of scientific methods.

Leguminous crops, including those grown for grain, require large amounts of soil moisture. Indigofera is a leguminous crop for which the required level of soil moisture is necessary for its growth, development, and the achievement of high and good-quality yields. This level of moisture is required for the maintenance of the plants in good physical condition and for the stimulation of photosynthesis in the cells, which results in normal growth and high yields.

Literature Review. C. Ajones observes that water availability is the predominant factor driving plant productivity under drought, thus giving a signature to a wide array of physiological processes. These are manifested through changes in leaf growth, reproductive activity, root development, and eventually yield formation [1].

According to C. Obiagwu, one must think that the farmers are aware of the behavior and ecology of legume cover crops before their introduction into farming systems, which could be tested for their tolerance to soil and climate conditions. Genetic evaluation for resistance against stresses such as water stress and diverse soil environments has been in need. The ability to understand the detailed soil water dynamics in legume crops is thus very important; this was what determined their water requirement [2; 3].

Ch. Kumari from India informs that water shortage affects the growth and yield parameters of indigofera negatively. Under arid (unirrigated) conditions, plant height decreased from 72.80 cm to 55.20 cm, branches per plant from 8.90 to 6.10, pods per plant from 383 to 295 [4].

Researchers I. Herdiawan, Abdullah, D. Sopandie, and N. Hidayati found in their experiments that the length of *Indigofera zollingeriana* root was 44.77 cm at 100% field capacity, while at 50% moisture this value increased to 68.94 cm and at 25% moisture reached 71.12 cm. The root length increased with increased water deficit by 26.35 cm, showing a strong drought-adaptation ability of the plant [5].

Research Results. The best irrigation plans were set based on the planting of *indigofera*. Before irrigation, soil moisture levels were checked using appropriate methods. In the first year (2023), *indigofera* planting occurred between April 1 and 5. When soil moisture levels were between 60-70-60% of limited field moisture capacity (LFMC) before irrigation, irrigation occurred 4 times using a 1-2-1 pattern. Soil moisture levels were checked at soil depths of 0-50 cm, 50-100 cm, and 100-70 cm. Soil moisture levels were at 12.0-14.8% of dry soil weight. This corresponds to 60.7-70.5% of LFMC. When soil moisture levels were between 70-70-60% of LFMC before irrigation, irrigation occurred 5 times using a 1-2-2 pattern. Soil moisture levels were at 12.5-14.8% of dry soil weight. This corresponds to 61.0-70.9% of LFMC.

1-Table

Soil moisture content of the experimental field with *Indigofera* planted before irrigation(2023-2025 yy).

Var No	Planting dates	Soil moisture content before irrigation relative to the CHDNS, %	Soil moisture content	Number of irrigations																	
				2023 y.	2024 y.	2025 y.	2023 y.	2024 y.	2025 y.	2023 y.	2024 y.	2025 y.	2023 y.	2024 y.	2025 y.	2023 y.	2024 y.	2025 y.			
				1			2			3			4			5			6		
1.	01-05.04	60-70-60	By weight	12,0	12,2	12,6	14,6	14,8	14,6	14,8	14,6	14,9	12,8	12,5	12,7						
			By CHDNS	60,7	60,9	60,4	70,1	70,4	70,1	70,5	70,3	70,6	61,5	61,1	61,3						
2.	01-05.04	70-70-60	By weight	14,8	14,5	14,8	14,5	14,3	14,6	14,6	14,4	14,7	12,7	12,6	12,8	12,5	12,3	12,6			
			By CHDNS	70,9	70,5	70,7	70,5	70,3	70,5	70,6	70,4	70,6	61,4	61,3	61,5	61	60,9	61,1			
3.	01-05.04	75-80-70	By weight	15,3	15,5	15,7	16,6	16,7	16,5	16,5	16,8	16,6	16,5	16,4	16,7	14,7	14,5	14,7			
			By CHDNS	75,3	75,7	75,9	79,7	79,8	79,6	79,4	79,9	79,7	79,5	79,3	79,8	70,6	70,4	70,7			
4.	10-15.04	60-70-60	By weight	12,1	12,3	12,8	14,3	14,5	14,8	14,5	14,3	14,7	12,6	12,4	12,7						
			By CHDNS	60,6	60,4	60,7	69,8	69,6	70,5	70,1	69,9	70,4	61,2	61,0	61,4						
5.	10-15.04	70-70-60	By weight	14,4	14,2	14,5	14,6	14,4	14,1	14,8	14,5	14,6	12,9	12,5	12,7	12,7	12,5	12,3			
			By CHDNS	70,5	70,2	70,6	70,7	70,5	70,0	70,6	70,1	70,2	61,7	61,5	61,7	61,2	61,0	60,9			
6.	10-15.04	75-80-70	By weight	15,4	15,2	15,7	16,1	16,4	16,6	16,5	16,3	16,6	16,8	16,6	16,2	14,5	14,5	14,2			
			By CHDNS	75,6	75,3	75,9	79,2	79,6	79,9	79,5	79,1	79,5	80	79,8	79,3	70,4	70,3	70,0			
7.	20-25.04	60-70-60	By weight	12,7	12,6	12,8	14	14,3	14,5	14,4	14,5	14,1	12,7	12,5	12,8						
			By CHDNS	61,6	61,5	61,7	69,5	69,8	70,2	70	70,1	69,7	61,3	61,1	61,6						
8.	20-25.04	70-70-60	By weight	14,6	14,4	14,6	14,8	14,6	14,8	14,5	14,4	14,6	12,3	12,6	12,5	12,5	12,7	12,3			
			By CHDNS	70,6	70,3	70,7	71	70,9	71,1	70,1	70,0	70,9	60,9	61,1	61,1	70,1	70,3	69,8			
9.	20-25.04	75-80-70	By weight	15,9	15,7	15,5	16,4	16,2	16,5	16,7	16,5	16,8	16,6	16,3	16,5	14,9	14,4	14,1	14,5	14,7	14,4
			By CHDNS	76,4	76,2	76,0	79,8	79,5	79,8	79,9	79,6	80,0	79,8	79,5	79,7	71	70,7	70,4	70,8	71,0	70,8

When soil moisture levels were between 75-80-70% of LFMC before irrigation, irrigation occurred 6 times using a 1-3-2 pattern. Soil moisture levels were at 14.7-16.6% of dry soil weight. This corresponds to 70.6-79.7% of LFMC.

Similar results were obtained for planting between April 10-15 and April 20-25. *Indigofera* was planted in early April 2024. Prior to irrigation, soil moisture was between 60-70-60% of limited field moisture capacity (LFMC). Four irrigation times, with a water application pattern of 1-2-1, were conducted before flowering, during flower and fruit set, and during ripening, respectively. Prior to irrigation, soil moisture levels in the soil layers of 0-50, 50-100, and 100-70 cm ranged between 12.2% and 14.8% of the dry soil weight, representing 60.9-70.4% of LFMC. When soil moisture levels prior to irrigation were between 70-70-60% of LFMC, five irrigation times with a water application pattern of 1-2-2

were conducted. Soil moisture levels ranged between 12.6% and 14.5% of the dry soil weight, representing 60.9-70.5% of LFMC.

If the soil moisture prior to irrigation relative to LFMC was at 75-80-70%, irrigation occurred 6 times during the growing season, and the soil moisture was at 14.5-16.8% of the dry soil weight and 70.4-79.9% of LFMC.

In the other planting dates of the study, similar results were found. For the year 2025, indigofera was planted on April 1-5. If the soil moisture prior to irrigation relative to LFMC was at 60-70-60%, irrigation occurred 4 times during the growing season, and the soil moisture was at 12.6-14.9% of the dry soil weight and 60.4-70.6% of LFMC.

If the soil moisture prior to irrigation relative to LFMC was at 70-70-60%, irrigation occurred 5 times during the growing season, and the soil moisture was at 12.6-14.8% of the dry soil weight and 61.1-70.7% of LFMC. If the soil moisture prior to irrigation relative to LFMC was at 75-80-70%, irrigation occurred 6 times during the growing season, and the soil moisture was at 14.7-16.7% of the dry soil weight and 70.7-79.8% of LFMC. See Table 1 of the article for the data.

Conclusion. The experiment proved that the growth and development of indigofera depend on the irrigation schedule. Thus, it is important to maintain the soil moisture at the right level to ensure that the indigofera plant grows and develops well, especially during the flowering and yield formation stages. Therefore, it is important to scientifically manage the irrigation plan and soil moisture in the cultivation of indigofera to ensure that the crop grows and develops well to produce high and good-quality crop yields.

REFERENCES:

1. Jones C.A. Growth, development and stress response. New York. 1985. -P. 419.
2. Obiagwu C. Screening process for ideal food legume cover crops in the tropical ecosystem. //Agric. 1997. Vol.10. -P. 5-14.
3. Doorenbos J., Pruitt W. Guidelines for predicting crop water requirements. FAO Irrigation and Drainage. FAO. 1997. Rome, Italy. P. -24.
4. Kumari Ch. Drought stress response on some morphological traits and seed yield of Indigo (*Indigofera lignifera* L.) under Tropical conditions. //International Journal of Advanced Life Sciences. 2020. Vol. 13(3). -P.73-76.
5. Herdiawan I., Abdullah., Sopandie D., Hidayati N. Morphological characteristics of *Indigofera zollingeriana* plants under different levels of drought stress//JITV. 2012. Vol. (17)4. -P.276-283.