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CU MATERIALE CONFERINȚEI ȘTIINȚIFICE ȘI PRACTICE INTERNAȚIONALE

MODALITĂȚI CONCEPTUALE DE DEZVOLTARE A ȘTIINȚEI MODERNE

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RESISTANCE OF COTTON VARIETIES TO WATER DEFICIENCY

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Global climate change is causing an increase in air temperature in the biosphere, while hot winds caused by a sharp drop in relative humidity in the summer months are causing atmospheric and soil drought. In the current period of serious water problems, it is very important to introduce water-saving agro-technologies, as well as to develop methods for growing cotton varieties that are resistant to soil and atmospheric drought and have a high efficiency of water use [1,2].

The strongest negative impact of adverse environmental factors, such as the atmosphere and soil drought, falls on the water-demanding-critical period of cotton, and the flowering stage. At the same time, due to the lack of water in the soil and high air temperatures together adversely affect the physiological and biochemical processes that take place in the cotton, the yield and its quality decreases. Therefore, it is important to zoning cotton varieties that are resistant to such factors based on specific soil and climatic conditions [3].

The negative impact of drought can be reduced to some extent by providing cotton varieties with sufficient mineral fertilizers, timely agro-technical processing, and the organization of crop rotation. It is also possible to increase the resistance of plants to the adverse effects of adverse factors by using the method of electrification [4].

The urgency of the above problem is that the soil and climatic conditions of the cotton-growing areas in our country are very different. The potential of cotton varieties planted in a particular ecological zone also varies depending on the level of agro-technical processing. One of the current problems is the scientific substantiation of the degree of soil drought tolerance of medium-fibre cotton varieties and their protective adaptive properties in the soil and climatic conditions of the middle and lower regions of the Zarafshan oasis [5].

The purpose of our research was to determine the degree and form of protective adaptation of cotton varieties to drought based on physiological and biochemical properties of water exchange, as well as to develop methods to increase drought tolerance.

Bukhara-6, Aqdarya-6, Bukhara-8, C-6524 and Bukhara-102 varieties of medium-fibre cotton were used as the object of the research. Research methods such as physiological, morphological, biochemical, biometric, statistical, comparative analysis, phenological, plasmolytic, gasometric were used during the research.

All experiments were conducted in the scientific laboratory and training field of Bukhara State University, as well as in the fields of farms. The soil of the experimental field belongs to the meadow-alluvial type, the depth of groundwater is 2-3 meters. Based on the pre-irrigation soil moisture, volumetric weight, and moisture capacity, the degree

of moisture depletion in the soil was determined and irrigation standards were set.

The experimental sites were divided into 3 sections. The experiments were performed in four repetitions. The experiments were carried out on the basis of agronomic techniques adopted on farms. Fertilizers were applied during ploughing, along with planting, and during plant growth (3 times). The total amount of fertilizers applied per hectare is nitrogen-250, phosphorus-175, potassium-100 kg. Phenological observations, calculations and research on plant growth and development were carried out in accordance with the methods of UzPITI. Determination of all physiological parameters and phenological observations were carried out in the experiments during the stages of combing, flowering and budding of cotton [5-12]. A fourth leaf developed from the third part of the main stem was taken for the study.

Physiological and biochemical processes of drought tolerance of cotton varieties and indicators of protective adaptive properties were determined using generally accepted methods in plant physiology and biochemistry.

The practical results of the study are as follows: Drought-resistant and high-yielding varieties of cotton Bukhara-6, Bukhara-102 and Bukhara-8 were recommended for high and quality yields in cotton farms located in the middle and lower regions of the Zarafshan oasis and where soil drought is observed. A rapid method for determining the resistance of a cotton plant to soil water scarcity has been developed and recommended for use. The use of electrification method to increase the drought tolerance, yield and quality of cotton varieties has been introduced into practice [13-19]. The scientific significance of the results of the study serves to develop the physiological and biochemical basis of adaptation of cotton varieties to different types of cellular, tissue and ontogenetic levels of adaptive protective responses and adaptation to soil drought, depending on the degree of soil drought. The practical significance of the results of the study is explained by the possibility of obtaining high-quality crops and saving irrigation water by planting drought-resistant varieties Bukhara-6, Bukhara-102 and Bukhara-8 in arid areas with high temperatures and water shortages.

As a result of the obtained scientific data, the laws of protective adaptation of cotton to drought at the cellular, tissue and ontogenetic levels were determined.

A physiological and biochemical comparative description of drought adaptation was developed based on the mechanisms of cotton adaptation to drought - reduction of water consumption, accumulation of low molecular weight osmoprotectants, changes in metabolism, increased water use efficiency.

The dependence of the reaction of cotton varieties to soil drought on the characteristics of the variety, the level of water supply to the physiological and biochemical processes of plants, as well as the impact on yield and its quality were determined.

It was observed that all cotton varieties grown under conditions of moderate soil moisture had significantly lower daytime and residual water deficits, leaf water potential, the osmotic pressure of cell sap, protoplasm viscosity, cell dehydration and heat resistance than plants grown in soil drought conditions.

Soil drought has led to a relative increase in the amount of bound water in all-cotton varieties, water scarcity in the leaves, protoplasmic viscosity, and dehydration and heat resistance of leaf cells. It was noted that the value of physiological and biochemical indicators of drought tolerance is highest in varieties resistant to drought. A rapid method for determining the amount of residual water deficiency and diffusion resistance, leaf binding water and bound chlorophyll in the leaves was developed and

proposed to determine the resistance level of the cotton plant to soil water deficiency.

In the years of water scarcity, atmosphere and drought, the use of environmentally friendly electrification methods has increased the resistance of cotton varieties to drought, yield and quality. It was recommended to sow Bukhara-6, Bukhara-102, Bukhara-8 varieties.

High-quality yields of Bukhara-6, Bukhara-102 and Bukhara-8 cotton varieties were determined in the order of 1-2-1, C-6524; Aqdarya-6 in the order of 1-3-1 irrigation; and the yield of cotton in Bukhara-6 varieties was 38.4– 40.7; and in the variety Bukhara-102 was 37.5–38.5; and in Bukhara-8 variety was 35.3–36.4 quintals, that means the quality of fibre meets international standards.

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