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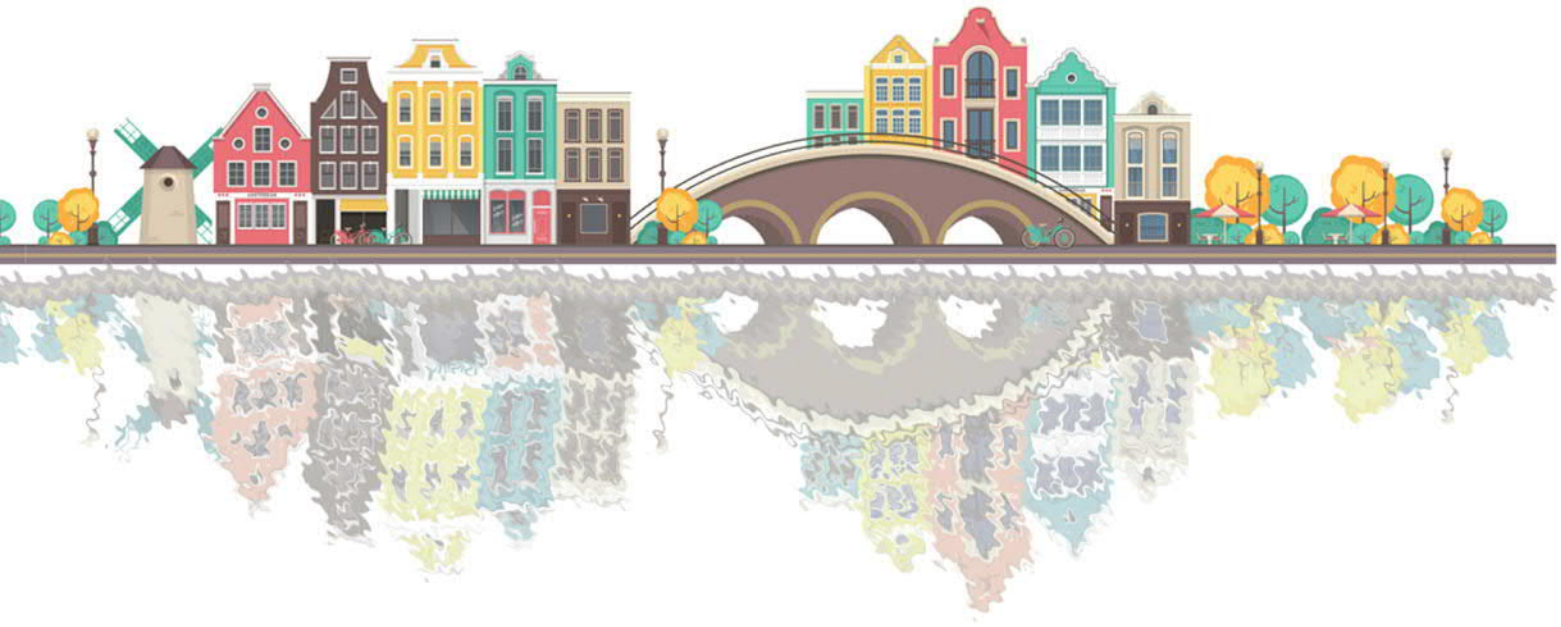

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COTTON WATER EXCHANGE IN WATER DEFICIENCY

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Global climate change is causing to the increase of air temperature in the biosphere. Also hot winds caused by a sharp drop in relative humidity in the summer months that are causing atmospheric and soil drought. At the present time, when the water problem has become serious one, it is important to introduce water-saving agro-technologies, as well as to develop methods of growing cotton varieties that are resistant to soil and atmospheric drought and have a high coefficient of water use [1-5].

The strongest negative impact of adverse environmental factors, such as the atmosphere and soil drought, falls on the water-demanding-critical period of cotton, as the flowering stage. At the same time, the lack of water in the soil and high air temperatures together adversely affect the physiological and biochemical processes that take place in cotton, resulting in a decrease of yield and quality. Therefore, it is important to zoning cotton varieties that are resistant to such adverse factors based on specific soil and climatic conditions [6-13].

The effect of soil moisture levels on the physiological and biochemical properties of water metabolism of cotton varieties were studied during the research. Bukhara-6, Bukhara-8, Bukhara-10, Sultan and Bukhara-102 varieties of cotton were used as the object of experiments.

The followings were justified during the research: drought tolerance has been defined by the long-term water resistance of a plant cell; the change in water balance in plants with different levels of drought resistance; the different drought tolerance of a group of plants grow under natural conditions; as well as the change in water balance is directly related to the degree of adaptation. It was found that the level of water supply to plants, along with agro-technical measures in the management of growth rate, plays an important role, moderate humidity activates the physiological processes of plants and allows efficient use of water [14-16].

It was revealed that the negative impact of water deficiency on growth processes varies depending on environmental factors, the strong impact of drought on plant growth processes, the response of plants to adverse factors consists of individual reaction and restitution (recovery) stages.

It was argued that drought slows the growth of the plant and its emerging organs, impacting in a decrease in biological and economic yield, and water scarcity in the soil slows down growth processes and has a negative impact on crop quality.

It has been proven that lack of water in the soil has a negative effect on all stages of development of plants, even after the moisture is again brought to a moderate level.

According to the analysis of scientific data, changes in the water balance of plants initially under the influence of drought, in turn, lead to changes in a number of physiological and biochemical processes, growth processes slow down, and overall productivity decreases.

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

During the experiments, the laws of protective adaptation of cotton to drought at the cellular, tissue and ontogenetic levels were identified; physiological, biochemical, habitual forms of drought tolerance of varieties depending on soil moisture level were scientifically based and a model of drought tolerant cotton varieties. Physiological and biochemical comparative characteristics of drought adaptation have been developed based on the mechanisms of physiological adaptation of cotton to drought - reduction of water consumption, accumulation of low molecular weight osmoprotectors, changes in metabolism, increased water use efficiency [17-19].

It was noted that due to the positive effects of electrification on the physiological and biochemical and water exchange processes, the drought tolerance of cotton, its yield and quality increased in conditions of soil moisture deficiency due to increased water storage properties, reduced daytime and residual water shortages. A rapid method was also developed to determine the degree of resistance of the cotton plant to soil water deficiency - residual water deficit and diffusion resistance in the leaves, the amount of bound water and bound chlorophyll in the leaves.

It was recommended to use drought-resistant and high-yielding varieties of cotton Bukhara-6, Bukhara-102 and Bukhara-8 for high and quality yields in cotton farms located in the middle and lower regions of the Zarafshan, where soil drought is observed, and developed a rapid method for determining the resistance of cotton plants to soil water scarcity. Also it was introduced the use of electrification methods to increase the drought tolerance, yield and quality of cotton varieties.

The results obtained during the studies serve to develop the physiological and biochemical basis of adaptation of cotton varieties to different types of cellular, tissue and ontogenetic adaptations of protective responses and adaptation to soil drought, depending on the degree of soil drought. 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 regions with high temperatures and water shortages has been scientifically substantiated.

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, cell sap osmotic pressure, 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 of the cotton plant to soil water deficit. In years of water scarcity, atmospheric and soil drought, the use of environmentally friendly electrification methods has led to an increase in drought tolerance, yield and quality of cotton varieties. In order to obtain high-quality cotton in the cotton farms of the regions where soil drought is observed, drought-resistant, high yield and quality of cotton Bukhara-102, It was recommended to plant Bukhara-8 and Bukhara-10 varieties.

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SECTION VII.
BIOLOGY