COTTON RESISTANCE INDICATORS IN THE CONDITIONS OF WATER DEFICIENCY

Global climate change is causing to the increase of air temperature in the biosphere, and hot winds caused by a sharp drop in relative humidity in the summer months are causing to atmospheric and soil drought. In the current period of serious water problems, 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 efficiency of water use [1-3].

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, 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 in 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 [4-8].

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 applying the method of electrification [9-12].

The actuality of the above problem is that the soil and climatic conditions of 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 [13-14].

During the experiments, the laws of protective adaptation of cotton to drought at the cellular, tissue and ontogenetic levels were determined, physiological, biochemical, habitual forms of drought tolerance of varieties depending on the level of soil moisture are scientifically based and on this basis a model of drought-tolerant cotton varieties were created [15-17].

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 osmoprotectants, changes in metabolism, increased water use efficiency [18].

Due to the positive effects of electrification on physiological, biochemical and water exchange processes, it was found that the increase in water retention, reduction of diurnal and residual water shortages, cotton's drought tolerance, yield and quality increased in conditions of soil moisture scarcity, and a rapid method for determining the diffusion resistance, the amount of bound water in the leaves, and the amount of bound chlorophyll was developed.

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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 quality were determined. Residual water shortages, the water potential of leaves, osmotic pressure of cell sap, protoplasm viscosity, cell dehydration, and heat resistance were significantly lower in all cotton varieties grown under moderate soil moisture than in plants grown in soil drought conditions [20].

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. To determine the degree of resistance of the cotton plant to water deficiency in the soil, a rapid method for determining the amount of residual water deficiency and diffusion resistance in leaves, bound water and bound chlorophyll in leaves was developed and proposed [21-23].

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.

References: