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EFFECTS OF SALT STRESS ON ECOPHYSIOLOGICAL TRAITS OF WHEAT

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Abstract
The article presents the data obtained in the study of the characteristics of the effect of soil salinity on the transpiration rate of wheat varieties. The rate of transpiration was determined at the tuber, flowering and milk-ripening stages of the cultivars. Based on the given results, it was noted that the value of the above indicator varies to different degrees in the section of varieties, depending on the soil salinity and the biological and variety characteristics of the varieties.

Keywords: winter wheat varieties, salinity, transpiration, water exchange, salt tolerance.

Introduction

Globally observed stress factors -have a serious negative impact on living organisms, including the world of plants. As a result, the productivity indicators of plants and the harvest and its quality are decreasing. Deepening of scientific and research work aimed at reducing the negative effects of such stress factors and development of measures to save the lost crop, assessment and justification of the physiological aspects of the effects of adverse stress factors are considered as the most important tasks [1-3].

Studying the mechanisms of resistance of plants to salt stress and revealing it is one of the urgent theoretical and scientific problems in the world. By deepening the research work in this field, creating methods of using exogenous and endogenous substances to increase the resistance of wheat to stress factors, wide use of the existing gene pool of crops in genetic-selection research and great attention paid to wide application to agricultural production. The need for such research is explained by the fact that it requires the activation of various physiological and biochemical mechanisms to overcome the stress that occurs in plants under the influence of salinity [4-8].

Grain crops are one of the important technical crops that provide raw materials for various branches of production. Optimum factors aimed at maintaining the crop are required when growing products at the level of demand. Improving the agro-melioration condition of the irrigated lands of our republic, improving the ecophysiological and agrotechnical measures used in the prevention of soil salinization, identifying, creating and putting into practice the varieties of agricultural crops adapted to stress factors, the physiological and biochemical characteristics of wheat varieties that express the level of resistance and productivity in stressful conditions, and the adaptation of varieties Certain results were achieved in the evaluation and scientific justification of reactions [9-14].

Abiotic stressors have a strong negative effect on agricultural plants, reducing plant growth and productivity. Water scarcity, soil salinity, and high temperatures are among the main causes of declining crop yields and food supplies around the world. Therefore, the study of the effects of abiotic stressors on plants and the mechanisms of stress resistance is one of the main areas of plant

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physiology. Mechanisms of resistance to abiotic stress also include practical aspects such as reducing the harmful effects of stress in different ways or using native varieties adapted to combined stress as a source of genetic material [15].

Climate change inevitably leads to the deterioration of the ecological situation, which causes the salinization of fertile soils, resulting in a sharp decrease in the productivity of agricultural crops. Saline soils are common in many countries of the world. They cover about a quarter of the earth's surface, including half of all irrigated land, and the saline areas are expanding. In the arid climate, almost all irrigation water evaporates, and soil salinity is gradually increasing [16].

Abiotic stressors are a major impediment to agriculture, dramatically reducing plant growth and productivity worldwide. Future declines in agricultural crop yields will be exacerbated by global warming, increased pollution, and declining fertile land. The main challenge facing agriculture today and in the future is to increase food production for an ever-growing population in many regions of the world in a deteriorating environment. Minimizing exposure to various abiotic stressors is a common challenge [17].

The study of mechanisms of resistance to abiotic stress is one of the most active areas of research in plant physiology, taking into account its practical importance in agriculture. Various abiotic stresses caused by the environment are usually interrelated and often have an osmotic component that affects the homeostasis of plant cells. To cope with abiotic stress, plants activate a series of stress responses that are characteristic of sensitive and tolerant plants because they use the same basic modifications [18].

Salinity is a major abiotic factor affecting crop productivity worldwide. Global warming is associated with more frequent, longer, and severe droughts in many regions of the world, as well as increased salinity in irrigated lands. About 20% of the world's irrigated land, which produces one-third of the world's food, is subject to secondary soil salinization. In addition, salt stress also induces ion stress and Na^+ toxicity [19].

Selection for salt tolerance should be based on the growth of plants over a period of time since individual cultivars within the same self-pollinated species have almost genotypically the same homozygote. Short-term studies may show reduced growth rates; however, these reductions may be the same for tolerant and susceptible species within a cultivar. Only after a long time can tolerance or sensitivity be accurately measured in an individual plant, or the identification of mechanisms that help certain plants withstand NaCl conditions at different stages of growth [20].

Salinity is a global problem for agricultural production. Understanding Na^+ sensitivity and transport in plants under salt stress will be useful for breeding salt-tolerant crop species. First of all, salt stress sensor representatives and the root meristem zone are proposed as tissues that store salt stress-sensing components. The importance of Na^+ excretion and vacuolar Na^+ sequestration in the general salt tolerance of plants is then highlighted. Finally, some aspects of plant salt stress tolerance, including cytosolic Na^+ concentration and the role of Na^+ as a nutrient, have been discussed.

Soil salinization has become one of the major environmental problems globally and is expected to worsen due to projected climate change. Arid and semi-arid agricultural areas are particularly sensitive to the effects of climate change on increased soil salinity.

Saline soils are common in many countries of the world. They occupy a quarter of the land surface, including half of the irrigated land, and the area of saline areas is gradually expanding. In arid climates, almost all irrigation water evaporates and soil salinity gradually increases. At present, more than 50-60 per cent of the irrigated lands are salinized to varying degrees and prone to salinization. The salts of saline soils of Uzbekistan are very different in terms of quality. Chloride, sulfate-chloride, chloride-sulfate, sulfate, and carbonate salinity types are found. Among them, chloride salinity is the most toxic.

Soil salinity has a harmful effect on vital metabolic, biochemical and physiological processes occurring in plants, which leads to deterioration of grain quality. The degree of change in grain quality due to salinity depends on the strength of the stress. From a physiological point of view, it causes osmotic stress due to the accumulation of salts in the root zone, which strongly disrupts cell ion homeostasis. Salt exposure initially causes osmotic stress, and later ion toxicity reduces growth, grain development, and quality, especially if exposure is prolonged. The deterioration of grain quality in cereal crops is also explained from the point of view of agrotechnics. Due to osmotic stress, the decrease in the water absorption capacity of the roots leads to a slowdown in growth and a decrease in yield and grain quality. Thus, grain quality is adversely affected by osmotic stress, the later stage is slower, and the phase of ion toxicity is more harmful [7].

The yield of cereal crops, including wheat, under controlled growth conditions, is the most reliable indicator of their tolerance to salt stress. It is known that the yield of grain largely depends on the proportion of individual elements of the ear structure, for example, the length and weight of one ear, the number and weight of grains in one ear, the weight of one grain, etc. The variability of these indicators depends, first of all, on the genotype, growth conditions and the level of influence of the leading factor.

Research object and methods

Winter wheat during experiments as an object of research Asr and Antonina varieties were used. In recent years, these varieties have been planted in large areas across the country. Observations and biometric measurements are carried out on model plants at odd returns. Phenological observations are carried out according to the methodology of the Agricultural Crops Variety Testing Inspection. In all experiments, options were triplicated and placed consistently across tiers.

Results and discussion

The purpose of the study: It is to determine the physiological characteristics of the effect of salt stress on the physiological and productivity indicators of winter wheat varieties in the conditions of the Bukhara region, and to develop physiological methods for determining the resistance of wheat to this factor and increasing it.

In order to determine the level of physiological resistance of wheat varieties to salt stress, the density of cell sap, the amount of chloroplast pigments, the rate of photosynthesis and the rate of respiration were comparatively analyzed, and in order to determine the physiological effect of salt stress on the water exchange of wheat varieties, the rate of transpiration, water content in leaves, water deficit in leaves, the amount of bound water, leaf water retention and cell turgor were evaluated in cultivar sections.

By studying the effect of soil salinity on the productivity of wheat varieties, the growth rate of the varieties, the expansion of the leaf surface of the varieties, the net photosynthetic productivity, the yield indicators are scientifically based, and the mechanisms of the physiological effect of salt stress on wheat have been developed, and the varieties that are resistant to soil salinity and have high productivity indicators are scientifically based. It was recommended to produce it in areas with high salinity.

Conclusions

Physiological methods were developed to quickly determine the level of resistance to salt stress of varieties by determining the amount of water bound in the leaves of winter wheat varieties, the level of cell turgor, and indicators of salt stress in the conditions of saline soils, and to increase the level of resistance to salt stress by treating their seeds before planting.

Based on the resistance characteristics of the varieties, practical recommendations were developed for their placement in the areas of the Bukhara oasis with different degrees of salinity and the areas with a strong effect of salt stress.

In the ontogeny of winter wheat varieties, the amount of bound water in the leaves, the level of cell turgor, the physiological methods of determining the level of resistance to salt stress by determining the parameters of the varieties and increasing the resistance to salt stress by treating the seeds before planting have been developed. The practical importance of the results of the research is determined by the possibility of planting the varieties Starshina, Krasnodarskaya-99 and Grom, which are resistant to salt stress, in areas with medium-high salinity, and the varieties Antonina, Alekseevich, Vassa, which are moderately resistant, in areas where the influence of stress factors is relatively weak, and the possibility of obtaining a high-quality harvest. The implementation of the recommendations will serve to improve the agrotechnology of growing winter wheat in areas with salinity.

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