EXPLORING THE IMPACT OF SALINITY STRESS ON DIVERSE WINTER WHEAT VARIETIES

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To provide the population with quality food products, great attention is being paid to agricultural sectors. In order to satisfy the population's need for high-quality food products, the main goal is to obtain a high and high-quality harvest from winter wheat varieties even in the conditions of soil salinity. Climate change inevitably leads to the deterioration of the ecological situation, and the drying of fertile soils, in turn, leads to increased salinity, which causes large crop losses.

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 there is a gradual expansion of saline areas. In arid climates, almost all irrigation water evaporates and soil salinity gradually increases. [1-4].

Excessive accumulation of soluble salts in the soil has a harmful effect on plants. Salts, which do not have a negative effect in weak concentrations, accumulate in cells and become toxic after high concentrations. These include sodium chloride and sodium sulfate salts. Studying the problem of salinity tolerance of plants in the world is of great theoretical and practical importance. The increase in soil salinity from year to year has a negative effect on obtaining high-quality crops from a number of agricultural plants. Saline soils are common in hot and dry climate zones, accounting for almost 25% of the earth's land area.[5-9].

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 phase is slower, and the ion toxicity phase is more harmful [10].

Plants are divided into two main groups, halophytes and glycophytes, based on their relationship to soil salinity. Plants that grow in brackish soils and are adapted to high soil salinity due to the signs and properties that appear in the process of evolution under the influence of living conditions during their ontogenesis are called halophytes [11-14].

Salt tolerance is variable according to the developmental stages of plants. Young plants are intolerant to salt, especially during the flowering stage, salt has a negative effect on plants. They grow poorly due to their sensitivity to salt, and as the plant grows, its tolerance to salt increases [15-19]. Excessive accumulation of salts in the soil is harmful to most cultivated plants. Salt-tolerant plants called halophytes grow in brackish soils. They differ from other plants by their several anatomical and physiological features. Excessive salinity of the soil is harmful to plants in two ways. On the one hand, the accumulation of salts increases the osmotic pressure of the soil solution. This pressure inhibits root movement and makes it difficult for plants to get water. At the same time, excessive accumulation of soluble salts in the soil, in addition to the osmotic effect, also has a toxic effect on plants. Even salts that are neutral in weak concentrations are toxic in high concentrations [20-27].

Winter wheat varieties were used during the experiments. The experiments were carried out in the fields belonging to the meadow-alluvial soil type with weak and moderate soil salinity. During the studies, the amount of bound water, the water potential of the tissues, and the density of the cell sap, which characterize the water exchange of the varieties, were determined [28-33].

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

In experiments other than the ones investigating the irrigation regime, the soil moisture was maintained at not less than 70% of the limited moisture capacity. In the experiments other than the experiments studying the irrigation regime, the moisture in the soil was maintained at not less than 70% of the limited moisture capacity. All technological methods, except for the methods studied in the experiment, were carried out based on general agrotechnics adopted by the region [34-39].

To obtain a high and high-quality grain yield from wheat, it is necessary to introduce new, fertile, fast-ripening varieties suitable for the soil and climate conditions of each region, resistant to the adverse effects of the external environment, i.e., resistant to salt, drought and heat, and with high grain quality, and the selection of imported varieties that are adapted to local conditions. and planting, establishment of their seed production system and improvement of agrotechnologies for growing high yield is a very important task.

Saline soils, which have a negative effect on many aspects of the physiological and biochemical processes of plants, slow down the growth and development of plants and, as a result, significantly reduce gross productivity. The most important criterion of salt tolerance of plants is high productivity in saline soils.

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 primarily on the genotype, growing conditions and the level of influence of the leading factor [39-43].

The salinity of irrigated lands drastically reduces the yield potential of wheat, which leads to a decrease in cultivated crops and, above all, the gross yield of wheat, which is very important for the food security of Uzbekistan.

Under these conditions, it is necessary to study and identify valuable wheat genotypes adapted to climate change. In this regard, the study of the mechanisms of adaptation and resistance of wheat to salt stress is relevant and of theoretical and practical interest. In addition, the study of the effect of soil salinity on the physiological and biochemical parameters of soft and hard wheat varieties allows us to determine the degree of adaptation of this type of wheat to salt stress and to develop new varieties. is the basis for creation. Physiological and biochemical aspects of resistance to salinity conditions of the soil, at the same time physiological and biochemical aspects of tolerance of grain crops to different types of salinity and characteristic features of salt stress effect on physiological and biochemical processes of wheat require reconsideration.

ResearchThe practical significance of the results is determined by the possibility of planting Krasnodarskaya-99 and Grom varieties, which are resistant to salt stress, in areas with medium-high salinity, and the Vassa variety, which is moderately resistant, in areas where the effects of stress factors are relatively weak. The implementation of the recommendations will serve to improve the agrotechnology of growing winter wheat in areas with salinity.

According to the obtained data, the response of the studied wheat varieties to soil salinity levels was different. The growth and development of all wheat varieties grown in the control variant, the activation of a set of physiological processes was determined. In variants with weak and medium levels of soil salinity, it was observed that wheat varieties differed sharply from each other, especially water exchange indicators. With an increase in soil salinity, the amount of bound water and the density of cell sap increased in all varieties, while the tissue water potential decreased. Such changes were different depending on the biological and individual characteristics of the varieties.

Due to the low level of resistance to stress factors and soil salinity, it is recommended to plant the Asr variety of winter wheat in non-saline or weak soil salinity areas.

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