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INFLUENCE OF SALINITY ON ECOPHYSIOLOGICAL CHARACTERISTICS OF WINTER WHEAT VARIETIES

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Abstract
The article describes the adaptation of wheat varieties to soil salinity. Stress factors affecting the physiological processes of wheat. Identification of mechanisms of plant resistance to salt stress is one of the most pressing theoretical and scientific problems in the world, by deepening scientific research work in this area, much attention is paid to the creation of methods for using exogenous and endogenous substances to increase the resistance of wheat to stress factors, the widespread use of the existing gene pool of agricultural crops in genetic selection research and widespread implementation in agricultural production.

Keywords: Factor, stress, culture, agriculture, gene pool, grain crops, Grom, Pervitsa, Starshina, Alekseevich, Krasnodarskaya-99, Vassa, Asr, Antonina.

Introduction

Stress factors observed on a global scale have a serious negative impact on living organisms, including the plant world. As a result, plant productivity indicators, as well as harvest and its quality, are reduced. In connection with the deepening of scientific research work aimed at reducing the negative impact of such stress factors, the development of measures to preserve lost crops, the assessment and substantiation of the physiological aspects of the impact of unfavorable stress factors, much attention is paid to the research carried out in this direction, which are the most important tasks. The study and identification of mechanisms of plant resistance to salt stress is one of the most pressing theoretical and scientific problems in the world, by deepening scientific research work in this area, much attention is paid to the creation of methods for using exogenous and endogenous substances to increase the resistance of wheat to stress factors, the widespread use of the existing gene pool of agricultural crops in genetic selection research and widespread implementation in agricultural production. The need to conduct such studies is explained by the fact that in order to eliminate the stress that occurs in plants under the influence of salinity, activation of various physiological and biochemical mechanisms is required.

Grain crops are one of the important industrial crops that provide raw materials for various industries. When growing products at the required level, optimal factors are needed to preserve

the harvest. Certain results have been achieved in the area of improving the agro-meliorative state of irrigated lands in our republic, improving ecological-physiological and agrotechnical measures to prevent soil salinization, identifying, creating and introducing into practice varieties of agricultural crops adapted to stress factors, as well as the assessment and scientific substantiation of the physiological and biochemical characteristics of wheat varieties, expressing the level of resistance and productivity under stressful conditions, and the response of varieties to adaptation.

Changes in the characteristics of growth, development and productivity of grain crop varieties under the influence of unfavorable factors were studied in the studies conducted by scientists from Uzbekistan S.K. Meliev (2022), H.Kh. Matniyozova (2022), D.N. Kadirova (2010), R. Siddikov, N. Umirov (2020) and other scientists. However, of practical importance are the determination of the physiological basis of resistance and the level of adaptation as a result of the impact of the salt stressor on winter wheat varieties, as well as the development of methods for determining and increasing stress resistance. We have conducted research work on the following wheat varieties: Grom, Pervitsa, Starshina, Alekseevich, Krasnodarskaya-99, Vassa, Asr and Antonina, which belong to the group of winter wheat varieties. The aim of the study is the physiological and biochemical features of winter wheat resistance levels to salt stress, selection of stress-resistant varieties and increasing their resistance. Physiological, biochemical, plasmolytic, morphological, biometric methods, comparative analysis, phenological, gasometric, statistical methods were used. The research work consisted of studying the following:

comparative analysis of the transpiration rate in leaves, the amount of total and bound water in leaves, residual water deficit of leaves, density of cell sap, intensity of photosynthesis, respiration and other indicators in order to determine the physiological characteristics of the effect of soil salinity on wheat;

determination of such indicators as the growth rate of varieties, the expansion of the leaf surface of varieties, the net productivity of photosynthesis, and the weight of the crop in order to study the effect of soil salinity on the productivity indicators of wheat;

development of a physiological method for pre-sowing treatment of wheat seeds and scientific substantiation of increasing the resistance of varieties to salt stress through its use;

development of scientifically based recommendations for the creation of soil salinity-resistant varieties with high productivity across regions.

Special attention was paid to transpiration. Due to transpiration, not only water evaporation through leaves is ensured, but also water adsorption, movement of water and substances dissolved in it throughout the plant. During the research, the transpiration intensity of zoned winter wheat varieties Grom, Pervitsa, Starshina, Alekseevich, Krasnodarskaya-99, Vassa, Asr and Antonina was studied at the stages of booting, flowering and milk ripeness. High transpiration intensity was noted in the wheat varieties Grom, Starshina, Krasnodarskaya-99. In the control variants, compared with the experimental samples, activation of water consumption by plant leaves was detected. Compared with the booting and flowering stages, an acceleration of water evaporation by plants was noted in all studied varieties in the milky ripeness phase. It was established that there are differences between varieties in transpiration

intensity. It was noted that the Starshina, Grom and Krasnodar-99 varieties had a significantly higher transpiration intensity than the Antonina, Alekseevich and Vassa varieties. The lowest results for this indicator were noted for the Pervitsa and Asr varieties. It was noted that the Starshina, Grom and Krasnodar-99 varieties evaporate more water than other varieties and activate their metabolic processes more intensively compared to other varieties. The total content and amount of bound water (Table 1) in the leaves, as well as the intensity of photosynthesis were also studied.

Table 1. Amount of bound water in leaves, %

№	Varieties	Experience Options	Tubing БС,%	Blossom БС,%	Milk ripeness БС,%
1	Starshina	1	9,8±0,4	10,9±0,5	12,5±0,9
		2	13,1±0,5	14,6±0,6	16,7±0,8
2	Pervitsa	1	8,8±0,3	9,4±0,7	11,4±0,7
		2	9,2±0,5	10,3±0,9	12,6±0,5
3	Antonina	1	9,2±0,6	9,5±0,4	10,4±0,5
		2	10,1±0,6	11,0±0,5	12,5±0,7
4	Grom	1	10,1±0,4	11,0±0,6	12,8±0,9
		2	13,3±0,8	14,3±0,7	16,0±0,7
5	Asr	1	8,6±0,9	9,1±0,6	10,1±0,6
		2	9,0±0,7	9,5±0,9	11,0±0,5
6	Alekseyevich	1	9,3±0,4	9,8±0,6	11,2±0,4
		2	9,9±0,3	10,4±0,9	12,6±0,9
7	Krasnodar-99	1	10,2±0,7	11,0±0,5	12,5±0,5
		2	13,5±0,9	14,4±0,4	16,6±0,7
8	Vassa	1	9,5±0,7	10,0±0,6	11,4±0,6
		2	10,1±0,5	10,8±0,4	12,9±0,7

Note: 1– control; 2– medium-heavy saline

It is noted that the value of this indicator increases from the tubing stage to the stage of milk ripeness in all varieties. The differences between the stages of tubing and flowering were minimal. In all varieties, salinization of the soil led to an increase in the value of the bound water content. At the same time, the rate of such growth was high in Krasnodar-99, Grom and Starshina varieties. In the course of field experiments, the effect of average soil salinity on the yield of wheat varieties was studied (**table 2**). Based on the data obtained, it was found that the productivity of the studied wheat varieties depends on the level of soil salinity. In particular, a decrease in crop weight as a result of medium-strong salinization of the soil was noted in all experimental variants. The yield of the studied wheat varieties in the control variants was the highest compared to the other experimental variants. A decrease in crop weight was observed in conditions of salinization of the soil. In all experimental variants, a decrease in crop weight was noted in all varieties compared with the control. Hundredweight of wheat with a yield then foreman V. control 64.2 candles; new candles Pervitsa - four 52.3; Antonina new candles - four 56.0; new candles Thunder - four 62.5; Wed-new candles - new candles 50.7 Alexey four year - 57.8 hundredweight; new candles Krasnodar-99 - four 60.6; Vassa new candles - 56.5

hundredweight. It is noted that the wheat yield level in the average of all varieties would then be studied varietally in comparison with the highly saline control boiler. V. Versification, foreman weight of hundredweight of wheat of the new crop composition of multivariate 62.3 experimental candles; new candles Pervitsa - four 48.1; Antonina new candles – four 53.1; new candles Thunder - four 60.3; Wed-new candles - new candles Alexey 46.2 four-year - 54.6 hundredweight; new candles Krasnodar-99 - four 58.2; Vassa new candles - 53.8 hundredweight. It was noted that the yields of Starshina, Grom and Krasnodar-99 varieties were the highest compared to other studied varieties in medium-highly saline soils. Under these conditions, the lowest yield results were observed in the Singer and Acp wheat varieties. According to these indicators, Antonina, Alekseevich and Vassa varieties took an intermediate place.

Table 2 The effect of soil salinity on crop weight

№	Varieties	Variantes	Productivity, ts/qa					
			2019	2020	2021	2022	В среднем	Разность с контролем,%
1	Starshina	1	63,2	62,5	65,3	65,8	64,2±0,15	100
		2	59,7	61,1	63,4	65,0	62,3±0,26	97,0
2	Pervitsa	1	54,1	55,3	49,7	50,1	52,3±0,19	100
		2	46,5	45,2	49,7	51,0	48,1±0,31	91,9
3	Antonina	1	56,5	59,2	53,7	54,6	56,0±0,38	100
		2	51,7	54,9	51,0	54,8	53,1±0,40	94,8
4	Grom	1	60,9	65,1	63,2	60,8	62,5±0,46	100
		2	58,2	60,9	57,9	64,2	60,3±0,51	96,5
5	Asr	1	48,2	49,3	52,5	52,8	50,7±0,23	100
		2	43,9	48,3	45,4	47,2	46,2±0,22	91,1
6	Alekseyevich	1	55,2	59,7	56,9	59,4	57,8±0,31	100
		2	55,9	54,1	52,9	55,5	54,6±0,36	94,4
7	Krasnodar-99	1	63,2	61,7	58,6	58,9	60,6±0,42	100
		2	56,9	61,2	58,9	55,8	58,2±0,35	96,0
8	Vassa	1	59,2	55,3	53,7	57,8	56,5±0,40	100
		2	51,2	55,8	51,0	57,2	53,8±0,42	95,2

Differentiation with control

The effect of soil salinity on the activity of physiological processes in wheat varieties was different depending on the varietal characteristics. The total amount of chlorophylls and the intensity of photosynthesis decreased compared to the control. At the same time, the intensity of respiration and the amount of bound water turned out to be higher under the influence of soil salinity compared with the control in all experimental variants. The salt-resistant Starshina, Grom and Krasnodar-99 varieties had lower photosynthetic productivity and lower yield weight under the influence of salinization than the other varieties studied. The effect of soil salinization caused a decrease in the biological and economic yields of all studied wheat varieties. It is proved that the characteristics of the resistance of varieties to soil salinity vary depending on their biological and individual characteristics. As a result of salt stress, the yield

level of all varieties decreased. At the moment, the Starshina, Grom and Krasnodar-99 varieties resistant to this factor have not shown drastic changes in indicators characterizing salt resistance and crop weight.

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