

Study of the influence of soil composition on the yield and quality indicators of wheat grain

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Abstract: Winter grain is a highly profitable crop, the cultivation of which allows solving a number of issues and problems of agriculture and the national economy: defi-phytosanitary condition and soil structure, expansion of the composition of winter crop precursors, soil enrichment with organic matter

Key words: soil, grain, culture, organic matter, composition and quality of grain processing products.

The grain yield is influenced by a whole range of factors, united in the concept of agrometeorological growing conditions, the so-called environmental factors [1-2].

The studies were carried out on saline soils of the Said Beshim Farm in the period from 2017 to 2019. Three options for the degree of soil salinity were selected: low, medium and high. The comparison sample was wheat grain grown on ordinary soil.

The grain quality of the studied wheat varieties was checked for compliance with the requirements of O'zDSt 880:2015.

Grain sampling was carried out according to O'zDSt ISO 950:2014.

To determine the quality indicators of grain, the research methods described in the relevant standards and guidelines [3-5] were used.

The average results of the studies are presented in tables 1.

Table 1
Yield and crop structure of wheat varieties

No	Wheat variety	Yield, c/ha	Density of standing before, pcs/m ²	Productive bushiness, pcs	Ear length, cm	Number of grains per ear, pcs	Grain weight of one ear, g	Weight of 1000 grains, g
Initial grain (prototype)								
1	Istiklol	67,80	350	3,21	8,6	47,82	2,41	40
2	Foreman	67,02	345	3,02	8,5	46,90	2,03	37
3	Chillacks	70,21	340	2,63	10,2	48,07	2,82	39
4	Krasnodar-99	64,80	378	2,71	12,2	48,23	2,82	39
• Low degree of salinity of the soil								
1	Istiklol	65,82	345	2,80	8,1	46,83	1,84	39,4
2	Foreman	65,03	340	2,62	8,0	45,91	1,43	36,6
Continuation of the table 3.7								
3	Foreman	68,22	335	2,25	9,8	47,06	2,06	38,3
4	Krasnodar-99	62,84	373	2,33	11,7	47,24	2,21	38,7
Average degree of salinity of the soil								
1	Istiklol	62,51	327	2,66	7,6	44,46	1,71	37,4

2	Foreman	61,75	323	2,47	7,5	43,61	1,33	34,7
3	Chillacks	64,79	319	2,09	8,7	44,65	1,90	36,3
4	Krasnodar-99	59,75	355	2,19	11,2	44,84	2,09	36,7
High degree of salinity of the soil								
1	Istiklol	59,39	311	2,53	7,1	42,24	1,63	35,5
2	Foreman	58,67	307	2,35	7,0	41,43	1,27	33,0
3	Chillacks	61,67	304	1,99	8,2	42,33	1,81	34,5
4	Krasnodar-99	56,77	338	2,09	10,7	42,42	1,99	34,9

The influence of the degree of soil salinity on the quality indicators and weed infestation of the studied wheat varieties grown on rainfed (ordinary) and saline soils was studied [4-6-7].

The compliance of the obtained values of the main indicators of grain quality with the requirements of O'zDSt ISO 950:2014 was determined. Technological indicators of grain quality of the studied wheat varieties grown on soils with varying degrees of salinity are presented in tables 2-5.

table 2

Technological indicators of grain quality of the studied wheat varieties grown on rainfed lands under normal conditions

Indicators	The value of quality indicators of wheat grain varieties				
	according to GOST (3rd grade)	Istiklol	Foreman	Chillacks	Krasnodar-99
Color and smell	Characteristic of a healthy grain of this type				
Mass fraction of moisture, %	14,0	11,3	10,6	11,5	12,0
Glassiness,%	40	74	76	78	80
Nature, g/l	730	775	768	750	770
Mass fraction of raw gluten,%	23,0	25,3	28,0	26,5	30,0
$H_{def}^{ИДК}$, ед.пр.	20-100	95	97	100	86
Quality Group	II	II	II	II	II
Weed admixture, % including mineral	2,0 0,3	1,1 0,2	1,9 0,3	1,9 0,3	1,4 0,3
Grain admixture,%	5,0	3,0	3,3	2,4	2,0
Pest infestation	Not ad.	Not detected			

It has been established that with an increase in the content of salts in the soil, the nature of the grain and the mass fraction of raw gluten decrease.

From the data in Table 3 it follows that wheat grain grown on rainfed lands under normal conditions, in terms of vitreousness (not less than 70.0%) and nature (not less than 745 g/l), belongs to the 3rd class, and according to the content of raw gluten - to the 2nd class (not less than 25.0%). At the same time, gluten was characterized as satisfactorily weak.

Table 3

Technological indicators of grain quality of the studied wheat varieties grown on soils with a low degree of salinity

Indicators	The value of quality indicators of wheat grain varieties				
	according to GOST (3rd grade)	Istiklol	oreman	Chillacks	Krasnodar-99
Color and smell	Characteristic of a healthy grain of this type				
Mass fraction of moisture, %	14,0	11,5	10,8	11,7	12,2
Glassiness,%	40	69	71	69	76
Nature, g/l	730	760	758	743	766
Mass fraction of raw gluten,%	23,0	23,3	26,2	24,5	29,0
$H_{\text{деф}}^{\text{ИДК}}$, ед.пр.	20-100	98	100	96	90
Quality Group	II	II	II	II	II
Weed admixture, % including mineral	2,0	1,5	2,0	2,0	1,5
	0,3	0,2	0,3	0,3	0,3
Grain admixture,%	5,0	3,2	3,0	2,5	2,0
Pest infestation	Not ad.	Not detected			

When growing wheat on soils with a low degree of salinity (Table 3), the studied wheat grain of Starshina and Krasnodarskaya-99 varieties belonged to the 3rd class (not less than 70.0%) in terms of glassiness, Istiklol and Chillaki " - 4th grade; in terms of nature and the content of crude gluten (not less than 22.0%), all varieties of wheat belonged to the 3rd class.

Table 4

Technological indicators of grain quality of the studied wheat varieties grown on soils with an average degree of salinity

Indicators	The value of quality indicators of wheat grain varieties				
	according to GOST (3rd grade)	Istiklol	oreman	Chillacks	Krasnodar-99
Color and smell	Characteristic of a healthy grain of this type				
Mass fraction of moisture, %	14,0	11,8	11,0	12,4	12,8
Glassiness,%	40	64	68	60	68
Nature, g/l	730	756	751	738	760
Mass fraction of raw gluten,%	23,0	21,4	24,3	21,5	27,0
$H_{\text{деф}}^{\text{ИДК}}$, ед.пр.	20-100	95	92	97	91
Quality Group	II	II	II	II	II
Weed admixture, % including mineral	2,0	1,7	1,6	2,0	1,8
	0,3	0,18	0,22	0,28	0,25
Grain admixture,%	5,0	3,0	3,1	2,7	2,6
Pest infestation	Not ad.	Not detected			

When growing wheat on soils with an average degree of salinity (Table 4), the grain of the studied wheat varieties in terms of vitreousness belonged to the 4th class, in terms of nature - to the 3rd, and "Chillaki" - to the 4th class, the content of raw gluten "Sergeant" and "Krasnodar-99" - to the 3rd, "Istiklol" and "Chillaki" - to the 4th class (at least 18.0%).

Table 5

Technological indicators of grain quality of the studied wheat varieties grown on soils with a high degree of salinity

Indicators	The value of quality indicators of wheat grain varieties				
	according to GOST (3rd grade)	Istiklol	oreman	Chillacks	Krasnodar-99
Color and smell	Characteristic of a healthy grain of this type				
Mass fraction of moisture, %	14,0	12,8	12,0	13,4	13,5
Glassiness, %	40	58	60	52	60
Nature, g/l	730	746	751	745	742
Mass fraction of raw gluten, %	23,0	20,0	20,2	21,3	24,0
$H_{\text{деф}}^{\text{ИДК}}$, ед. пр.	20-100	95	90	94	93
Quality Group	II	II	II	II	II
Weed admixture, % including mineral	2,0 0,3	1,8 0,2	1,6 0,2	2,0 0,3	1,8 0,2
Grain admixture, %	5,0	3,2	3,3	3,1	2,9
Pest infestation	Not ad.	Not detected			

When growing wheat on soils with a high degree of salinity (Table 5), the grain of the studied wheat varieties in terms of vitreousness and crude gluten content belonged to the 4th class, in terms of nature - to the 3rd, and "Krasnodarskaya-99" - to the 4th class. my class.

From the data of tables 2-5 it follows that with an increase in the content of salts in the soil, the nature of the grain decreases, the grain is feeble, and the yield of raw gluten decreases.

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