THE ELEMENTS OF POTENTIAL SOIL FERTILITY RELATING TO WINTER WHEAT PRODUCTION IN THE NORTHERN AGRICULTURAL AREA OF THE REPUBLIC OF MOLDOVA

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Abstract

The Northern Development Region of the Republic of Moldova (NDR) includes 11 administrative districts (Briceni, Edineţ, Dondușeni, Drochia, Fălești, Florești, Glodeni, Ocnița, Rîșcani, Sângerei, Soroca), including the municipality of Bălți. The NDR corresponds to the Northern Agricultural Zone, representing 32.9% of the total area of the Republic of Moldova. The area has significant potential in the cultivation of the main strategic and export crops of the region - wheat, corn, sunflower and others, an area characterized by highly fertile soils - chernozems, with favorable grades of soil creditworthiness. In food security, the soil represents an important link regarding the fertility and productivity of cultivated crops. Currently, these are vulnerable to climate change and the risks that accompany them, including high temperatures during critical phases of plant development, lack of moisture in the soil due to insufficient atmospheric precipitation, lack of nutritional elements for plants and others. The elements of potential fertility with a determining role in food security are climatic conditions and soil characteristics: texture, organic matter content (humus), nutrients - NPK, which as a whole will determine the physical, hydro-physical characteristics and the conditions for plant growth and development. These characteristics have a major role in the accumulation, mobility and storage of moisture reserves, providing the plant with water and nutrients. In 2025, along with production, the quality of winter wheat on loamy-clay and clay-loamy leached chernozems was also researched. The comparative evaluation on several polygons highlighted varieties with high protein content (10.5%), gluten (26%), Zeleny index (56 ml), compared to agrocenoses characterized by low protein indices – 8.1%, gluten – 16%, Zeleny index – 38ml.

Keywords: winter wheat, leached chernozems, harvest quality, gluten, climatic conditions.

Winter wheat is a strategic and food security crop. In the Republic of Moldova, the areas cultivated with winter wheat have varied over the last 45 years, between 212 and 300 thousand ha annually, and the annual global harvest has varied within very wide limits from 407 to 1300 thousand tons (statistical data, 1980 - 2024). The average weighted yield per 1 ha of winter wheat in the Republic of Moldova deviates significantly in the last five years, from 1.8 t/ha (2020) to 4.18 t/ha (2023), with maximum values of about 4.69 t/ha in 2021.

Some elements of potential and actual fertility were researched for cambic (leached) chernozems with winter wheat, Northern area of the Republic of Moldova, agricultural year 2024-2025. For comparison, some representative data for the agricultural year 2023-2024 were also included.

Soil texture is the main physical property, with a particularly important role in determining most of the other physical properties, as well as many chemical properties. As a result, texture is of particular importance in relation to the soil's productive capacity, its agronomic and ameliorative characteristics, and the technology of superior utilization of soil resources. The characteristic of soil texture must be researched not only in terms of evaluating the properties of the pedogenetic profile, but also in terms of the role of the soil grain size composition in shaping agricultural production and the quality of food products. Agricultural practice has proven that the most favorable soils by texture are loamy and loamy-clayey soils that contain proportionally sandy and clay particles.

In 2025, based on pedological studies for 20 localities in the northern agricultural area of the Republic of Moldova, the main textural varieties of representative soils with reference to some field crops were highlighted. It was highlighted that under the conditions of the soil cover with highly fertile loamy-clay and clay-loamy chernozems, with a soil creditworthiness of over 80 points, the winter wheat harvest varied in 2025 within the limits of 6-9 t/ha, with an average of approx. 6.7 t/ha (Plop village, Donduseni district). The 2024-2025 agricultural year was

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more favorable for winter wheat, compared to the 2023-2024 agricultural year, in which the harvest was 3.5-7.0 t/ha, the average of 5.5 t/ha.

MATERIALS AND METHODS

In the context of highlighting some elements of soil fertility and indicators of agricultural crop productivity regarding ensuring food security in the Republic of Moldova under climate change conditions, representative localities of the 5 pedogeographical districts, located in the North Moldavian Plateau, the North Moldavian Plain and the Soroca-Rezina Height, were researched in 2025: pedogeographical district 1 of gray soils, luvic and leached chernozems of the forest-steppe of the Northern Plateau; ecopedological district 2 of typical and leached chernozems of the forest-steppe of the Middle Prut Hills; district 3 with typical chernozems, the steppe of the Balti Plain, including microdistricts 3a, 3b, 3c; pedogeographical district 4 with leached chernozems, typical and gray soils of the forest-steppe of the Soroca Hills; district 5 of leached and luvic chernozems with gray soils, forest-steppe of the Rezina Hills.

For assessment were selected 20 localities, where the soil cover structure, types, subtypes, textural varieties and soil quality score were evaluated, according to soil properties with a determining role in influencing potential and actual fertility. The soil cover was investigated based on previous pedological studies and current research. Methods for determining the physico-chemical and physical properties according to the methods accepted by the ecopedological monitoring (Andriucă V., 2008, 2021; Cerbari V., 2010). Determining the granulometric composition according to N. Cacinschi (pipette method), soils dispersion degree using tetra sodium pyrophosphate ($Na_4P_2O_7$) of 4% (STAS 12536-79).

Currently, this method is very laborious and is related to the method of determining soil texture using the Anton Paar Sedigraph. The determination of the qualitative indices of winter wheat was carried out instrumentally, applying Multi-Bruins Instruments CHECK, by evaluating the content of: protein, %; gluten, %; Zeleny index, ml; moisture, % and others.

RESULTS AND DISCUSSIONS

The production of field crops is significantly influenced by the plant variety, climatic and ecopedological conditions, and the technology practiced. Soil texture is the main physical property, with a particularly important role in determining most of the other physical properties, as well as many chemical properties. As a result, texture is of particular importance in relation to the production capacity of the soil, its agronomic and ameliorative characteristics, and the technology of superior utilization of soil resources (Canarache A., 1990). The textural variety of the soil determines the aero-hydric conditions, porosity, hydro-permeability, hydro physical capacities, the total adsorption capacity of chemical elements, including nutritional elements, the content of humus (organic matter), the content of microelements, the thermal regime, the potential and effective fertility. The characteristic of soil texture must be researched not only in terms of evaluating the properties of the pedogenetic profile, but also in terms of the role of the soil in the formation of agricultural production and the quality of food products.

In agroecological research we find established correlative relationships between various textural types, subtypes and varieties) with the harvest of cereal and grain crops (Duda G. *et. al.,* 1973, cited after Kruglov N. *et al.,* 2002), *table 1-3*. Agricultural practice has proven that the most favorable soils by texture are loamy and loamy-clayey soils that contain proportionally sandy and clay particles. The soils of the Republic of Moldova for the most part (Cerbari V., 2010) have a favorable and homogeneous arable horizon by texture, with the exception of silted soils (chernozems and grizioms), salinized soils, predominantly solonets, which are specific objects for field crop agriculture.

Numerous studies of the influence of soil grain size composition on grapevine productivity have determined and indicated the optimal clay content in the soil that ensures maximum production of this crop (Valicov V., Fisicov A., 1981, cited after Kruglov N. *et al.,* 2002). It has been shown that on soils heavy in texture, the sugar content of grapes decreases and the acidity increases. It has also been shown that red technical varieties are more plastic to the soil texture, compared to white technical varieties of grapes. It is evident from the bibliography that the analysis of the soil grain size composition constitutes an important part of analytical research into the fertility and productivity elements of agricultural lands. In 2025, based on pedological studies for localities in the northern agricultural area of the Republic of Moldova, the main textural varieties of representative soils were highlighted (*table 4*). It was highlighted that the predominant soils represented by leached chernozems are loamy-clayey and smaller areas are clay-loamy (*table 4-5*).

Table 1

Influence of soil texture on production harvest of agricultural crops (Duda G. *et al*., 1973, quoted after Kruglov N. *et al.,* 2002)

Soil subtype and textural variety	Average yield of cereal and grain crops, t/ha
Grey soils:	
Sandy-loamy	3.7
Loamy-sandy	5.9
Loamy	6.9
Loamy-clayey and clayey	5.0
Molic-gray soils:	
Loamy	7.7
Loamy-clayey	7.5
Clay-iluvial chernozems:	
Loamy	10.3
Loamy-clayey	9.3
Cambic chernozems (leached):	
Loamy	10.8
Loamy-clay	9.8
Clay	9.5

Table 2

Correlation of crop yield with the size of the sand diameter in the investigated substrate (Mitcerlih A., cited after Kruglov N. *et al.,* 2002).

Crop	Average yield, g/vegetable pot	Harvest (average%) depending on the size of the sand diameter, mm.				
		0.25-0.5	0.5-1.0	1.0-2.0	2.0-4.0	4.0-6.8
Potatoes	95.5	128	116	94	92	71
Peas	71.3	143	104	98	78	77
Rye	2.9	173	161	77	47	43

Table 3

Influence of the granulometric composition of ordinary chernozem on corn production (Lebedeva I. *et al.,* cited after Kruglov N. et al., 2002).

Soil name	Physical clay content in A+B1 horizons	Corn harvest, green mass, t/ha
Ordinary chernozem, weak humifying, medium deep, loamy-clayey	52	21,5
Ordinary chernozem, weak humifying, medium deep, loamy	35	23,1
Ordinary chernozem, weakly humifying, medium deep, sandy-loamy	26	18,8
Ordinary chernozem, weak humifying, medium deep, sandy-loamy	13	16,8

In researching potential and actual fertility as elements of food security, an important role should be given to previous complex pedological research, current agroecosystem research, according to data for the Northern agricultural zone of the Republic of Moldova.

An essential role is played by monographic research on monitoring the ecopedological characteristics of soils, including those in the Northern agricultural zone (Cerbari V., 2010; 2023; Ursu A., 2011; Krupenikov I. A, 1985). Research on some fertility elements of leached chernozems in the Northern agricultural zone (Andriuca V., 2008; 2017; Racoviţa, Gh., 2018) indicates favourable pedological quality for field crops, expressed by neutral reaction of the soil solution, average total cation exchange capacity (30-33 me/100 g soil) with a Ca:Mg ratio of 4.5:1, moderate humus content, deep humification of the profile.

The data on the characteristics of the textural varieties of the Northern agricultural zone of the Republic of Moldova show the predominance of loamy-clayey soils (*table 4*) by 99-100% in the transition localities from the 1st ecopedological district to the 2nd ecopedological district.

On the polygons of the current study, soils with loamy-clayey texture predominate, and in the composition of the granulometric fractions, fine clayey and dusty fractions predominate (*table 5*).

The most representative soils of Plop locality, Donduşeni district are presented in *table 6.* The soils are characterized by a high score (62-100 points) according to properties, but also according to the productivity of field crops. The lands fall into the class of good and very good soils according to the degree of fertility, *table 6-7.*

The representative soils investigated in Donduşeni district, Plop locality are Chernozems, Phaeozems, Greyzems (Luvisol), corresponding to the general zonal pedoecological diagnoses according to the soil profile, the particularities of the distribution of granulometric fractions, humus, nutritional elements. The arable Phaeozems and Greyzems investigated have a lower humiferous thickness of the upper layers (0-50 cm), compared to the Chernozems which are medium and high humiferous, deep (*table 7*).

In the research locality Vasileuţi (*table 8*) the soil cover is more homogeneous, mostly represented by the leached loamy-clayey chernozem. The soils are fertile and highly fertile according to the soil valuing grade (table 8-9). The high fertility of these soils has caused intensive exploitation under field crops, which has led to weak, medium and high erosion of the leached chernozems. In the soil cover of the locality, both eroded soils and cumulation soils are recorded.

The soils on the slopes are characterized by a lower fertility level, according to the thickness of the humiferous layer, humus content, cationic adsorption capacity. Here the soils are homogeneous according to the granulometric composition throughout the pedogenetic profile, with small exceptions induced by the cambic process (depth 50-70 cm), *table 9*.

Table 4

Characteristics of textural varieties (% of the total surveyed area) of some lands in the Northern agricultural zone of the Republic of Moldova

No.	Locality, district, year of research	Ecopedological district/microdistrict	Total area, ha/average rating score	Heavy clays, %	Clay Loam, %	Clay-loam, %	Loamy, %	Sandy, %
1	Plop, Donduşeni, 2008	1	3088/72	-	29.2	68.3	2.5	-
2	Moşana, Donduşeni, 2008	1/8	2080/68	-	25.2	72.1	2.7	-
3	Ţaul, Donduşeni, 2008	1	3547/72	+	23.2	76.0	0.8	-
4	Lincăuţi, Ocniţa, 2009	1	2235/73	-	32.0	68.0	-	-
5	Briceni, Briceni, 2005	1	207/59	1,7	32.8	65.5	-	-
6	Corjeuți, Briceni, 2004	1	3640/66	-	59.8	40.2	-	-
7	Șofrâncani, Edineţ, 1993	2/14	2765/70	-	0.8	99.2	-	-
8	Vasileuţi, Rîşcani, 1994	2	2181/71	-	-	100	-	-
9	Rubleniţa, Soroca, 2012	4	2054	-	48.8	48.8	2.4	-
10	Corlăteni, Rîşcani, 1993	3	2015/70	-	66.8	30.5	2.7	-
11	Limbenii Noi, Glodeni, 2023	3	1669/69	-	6.1	91.0	2.9	-
12	Glinjeni, Făleşti, 2007	3	5047/50	-	32.5	67.5	-	-
13	Hiliuţi, Făleşti, 2007	3	2158/71	-	54.1	45.9	-	-
14	Cetâreni, Ungheni, 2002	3	2207/56	-	21.6	71.2	7.2	-
15	Todireşti, Ungheni, 2002	3	3594/59	-	21.5	78.0	0.5	-
16	Pohoarna, Şoldăneşti, 2019	5	2700/64	-	8.8	72.8	17.4	1

Table 5

Characteristics of the percentage content of granulometric fractions of leached chernozems from the Northern Agricultural Zone of the Republic of Moldova

No.	Soil type	Sample depth, cm	Percentage content of fractions, %						
			1.0-0.1	0.1-0.05	0.05-0.01	0.01-0.001	0.001	>0.01	<0.01
1	Leached chernozem	0-20	0.74	12.63	33.04	25.66	27.93	46.41	53.59
		30-40	0.80	12.15	34.99	24.91	27.15	47.94	52.06
		50-60	0.56	11.64	31.94	26.33	29.63	44.04	55.96
		90-100	0.36	10.25	34.42	26.25	28.72	45.03	54.97
		190-200	-	8.64	32.75	28.57	30.64	40.79	59.21
2	Leached chernozem, slightly eroded	0-20	1.28	15.25	24.41	28.64	30.73	49.63	59.37
		30-40	1.36	14.63	25.96	27.91	30.15	41.94	58.06
		50-60	0.86	14.64	26.34	27.95	30.21	41.64	58.16
		70-80	0.70	11.05	28.93	28.18	31.14	40.68	59.32
		190-200	0.32	8.23	30.87	28.65	31.93	39.42	60.58

Table 6

Representative soils in Plop village, district Donduşeni

№	Soil type	Area, ha	% of the total area	Bonitation degree
				According to characteristics
1	Greyzem (luvisol luvic) clay-loamy	49	1.56	68
2	Phaeoziom haplic loamy-clay	31	0.99	78
3	Phaeoziom haplic clay-loamy	465	14.79	78
4	Phaeoziom haplic weakly eroded clay-loamy	201	6.39	62
5	Luvic chernozem loamy-clay	23	0.73	88
6	Luvic chernozem clay-loamy	173	5.50	88
7	Luvic chernozem weakly eroded clay-loamy	24	0.76	70
8	Levigated chernozem loamy-clay	106	3.37	94
9	Levigated chernozem clay-loamy	461	14.66	94
10	Levigated weakly eroded loamy-clay chernozem	185	5.88	75
11	Levigated moderately eroded clay-loamy chernozem	18	0.57	66
12	Typical clay-loamy chernozem	23	0.73	100
13	Typical deep humiferous clay-loamy chernozem	198	6.30	82
14	Typical deep humiferous loamy chernozem	15	0.48	74
15	Typical deep humiferous weakly eroded clay-loamy chernozem	125	3.98	66
16	Levigated chernozems weakly and moderately eroded loamy-clay	154	4.90	71
Plop		Total, 3144ha		Medium - 72

Table 7

Physico-chemical indices of the soils in Plop village, Donduseni district

№	Soil type	Depth, cm	Hygroscopic water, %	Humus According to Tiurin, %	The sum of adsorbed cations, me/100g sol	Adsorbed cations, me/100 g sol		Carbonate content, %	pH_{KCl}	pH_{H2O}	Granulometric composition, %	
						Ca^{++}	Mg^{++}				>0,01	<0,01
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Greyzem (luvisol luvic) clay-loamy	0-20	5.15	2.34	31.1	23.9	7.2	-			47.71	52.29
		35-45	5.04	1.41								
		55-65	4.93	0.75				9.2		7.9	40.40	59.60
		75-85	4.82	0.66								
		90-100	8.71	0.43								
2	Phaeoziom haplic clay-loamy 3.-79	0-20	5.04	2.50	27.2	23.2	4.0		5.9		48.08	51.92
		30-40	5.15	1.86								
		50-60	5.26	1.28								
		70-80	5.37	0.95								
		90-100	5.48					7.0		8.5	37.00	63.00
3	Phaeoziom haplic weakly eroded clay-loamy	0-20	4.73	2.21	24.7	22.2	2.5		5.0		46.40	53.60
		30-40	4.46	1.38					5.2			
		50-60	4.48	0.87					5.4			
		75-85	4.62	0.47					5.7			
		190-200	4.60	-					7.4		46.51	53.49
4	Luvic chernozem clay-loamy	0.-20	5.70	3.22	27.6	22.4	5.2		5.6		44.09	55.91
		35-45	5.70	3.02					5.8		41.97	58.03
		55.65	5.60	1.73								
		110-120	5.61					8.6		8.1	37.82	62.18
5	Levigated chernozem clay-loamy	0-30	4.75	3.16	27.8	22.6	5.1			6.7	46.40	53.60
		30-40	4.67	3.06								
		5-60	4.02	2.31								
		70-80	4.53	1.40								
		90-100	4.45	0.83				6.9		8.0	40.80	59.20

continuation table 7

1	2	3	4	5	6	7	8	9	10	11	12	13
6	Levigated weakly eroded loamy-clay chernozem	0-20	6.15	2.90	31.0	27.3	3.7		6.3		39.94	60.04
		30-40	6.04	1.84							36.86	63.14
		55-65	6.15	1.34								
		90-100	5.82					7.1		8.2	33.79	66.21
7	Typical clay-loamy chernozem	0-20	5.47	4.41	31.0	36.7	4.3			6.9	41.12	58.88
		30-40	5.36	3.94								
		50-60	5.35	2.40								
		70-80	5.25	1.62				3.8		8.1		
		90-100	5.01	1.39								
		110-120	4.70					12.5		8.2	42.28	57.72

Table 8

Representative soils in Vasileuti village, Riscani district

№	Soil type and texture	Area, ha	% of the total area	Bonitation degree, point
				According to characteristics
1	Chernozem levigated (cambic) deep humiferous clay-loamy	554	25.4	94
2	Chernozem levigated moderately humiferous clay-loamy	210	9.63	85
3	Chernozem levigated weakly eroded clay-loamy	569	26.09	75
4	Chernozem levigated moderately eroded clay-loamy	56	2.57	56
5	Typical weak humiferous (deep)clay-loamy chernozem	55	2.52	82
6	Typical weak humiferous (moderately) clay-loamy chernozem	58	2.66	74
7	Typical weak humiferous weakly eroded clay-loamy chernozem	32	1.47	66
8	Carbonate Chernozem weakly eroded clay-loamy	32	1.38	43
9	Cumulic chernozemoid soil clay-loamy	28	1.28	89
10	Chernozems levigated weakly and moderately eroded clay-loamy	225	10.32	65
Medium				71

Table 9

Physico-chemical indices of the soils in Vasileuti village, Riscani district

№	Soil type	Depth, cm	Hygroscopic water, %	Humus According to Tiurin, %	The sum of adsorbed cations, me/100g sol	Adsorbed cations, me/100 g sol		Carbonate content, %	pH H_2O	Granulometric composition, %	
						Ca^{++}	Mg^{++}			>0,01	<0,01
1	2	3	4	5	6	7	8	9	10	11	12
1	Chernozem levigated (cambic) deep humiferous clay-loamy (nr. 52)	0-20	5.2	3.04				-	6.3	48.91	51.09
		30-40	5.0	2.74					6.4	46.56	53.44
		50-60	5.2	2.55					6.3	47.20	52.80
		70-80	4.9	1.85					6.5	49.22	50.78
		90-100	4.7	1.26					6.8	50.54	49.46
		140-150	4.7	-				1.6	7.4	52.88	47.12
2	Chernozem levigated (cambic) deep humiferous clay-loamy (nr. 57)	0-20	5.2	3.31	32.8	24.4	8.4		6.5	49.34	50.66
		30-40	5.0	3.02	33.1	25.0	8.1		6.7	47.26	52.74
		50-60	4.9	2.74	31.2	26.0	5.2		6.7	48.07	51.93
		75-85	4.8	1.04					7.1	45.84	54.16
		90-100	4.9	0.79				11.4	7.6	47.14	52.86
		140-150	4.7	-				9.0	7.6	44.09	55.91
3	Chernozem levigated (cambic) deep humiferous clay-loamy (nr. 58)	0-20	5.2	3.69	31.2	23.4	7.8		6.7	47.76	52.24
		30-40	5.4	3.18	32.8	27.1	5.7		6.8	46.26	53.74
		50-60	5.3	2.46					6.9	48.14	51.86
		70-80	5.0	0.82					7.2	45.72	54.28
		90-100	4.9	0.80				12.2	7.7	44.92	55.08
		140-150	4.7					12.2	7.7	46.87	53.13

continuation table 7

1	2	3	4	5	6	7	8	9	10	11	12
4	Chernozem levigated weakly eroded clay-loamy (nr. 7)	0-20	5.5	2.99	29.4	22.3	7.1		6.5	45.03	54.97
		30-40	5.3	2.02	28.9	22.2	6.7		6.8	46.18	53.82
		50-60	5.4	1.24	30.3	22.1	8.2		6.8	45.27	54.73
		65-75	5.0	0.79					6.7	48.63	51.37
		90-100	4.9					5.2	7.5	51.74	48.26
		140-150	4.6					5.6	7.6	54.40	45.60
5	Typical weak humiferous (moderately) clay-loamy chernozems (nr. 41)	0-20	5.8	3.62	30.3	22.7	7.6		6.9	57.23	42.47
		30-40	5.6	2.99	29.2	23.0	6.2		6.7	55.64	44.36
		45-55	5.5	2.49	29.7	21.7	8.0		6.8	54.86	45.12
		60-70	5.4	1.61				0.2	7.5	56.42	48.58
		80-90	5.3	0.69				4.2	7.8	58.40	41.60
		140-150	5.0					13.4	7.8	59.59	40.41

In 2025, 3 varieties of winter wheat approved in the Republic of Moldova and Romania were subjected to qualitative evaluations in production: Alcantara (approved in Romania, production conditions - Agro-Panfil, Plop locality, Donduşeni district); Glossa variety (approved in the Republic of Moldova, 2017 production conditions - Agro-Panfil, Plop locality, Donduşeni district); Dumbraviţa variety (approved in the Republic of Moldova, 2017 production conditions - Vasileuţi locality, Rîşcani district).

The determination of winter wheat quality indices was carried out in the Soil Analysis Laboratory, UTM, 2025 using the Multi-Bruins Instruments CHECK apparatus. A significant differentiation of winter wheat quality was highlighted, largely influenced by the variety (tab. 10) and the year of reproduction of the seed material. The 2024-2025 agricultural year was a favorable year in terms of climatic conditions for the northern agricultural area of the RM.

According to (Andries S., 2011) the level of crop yield depends largely on the level of effective soil fertility and the natural environment, but according to current data the level of yield depends significantly on the seed material. This is explained by the current decentralized way of managing agricultural land.

Elite varieties in the conditions of the Northern Agricultural Zone of the Republic of Moldova recorded approx. 9t/ha. In the locality of Vasileuţi, Rîşcani, the productivity of varieties from the third year of reproduction recorded lower harvest values with an unsatisfactory quality of wheat for bread making (*table 10*).

According to the qualitative indices of protein content, gluten and Zeleny Index, the varieties cultivated in Agro-Panfil (Alcantara and Glossa) stand out as highly productive, where the protein content was 10.5%, gluten, 21-26%, Zeleny Index 48-56 ml. More poor in quality, both in 2024 and 2025, was the winter wheat cultivated on the leached loamy-clay chernozem in Vasileuţi, Rîşcani, which does not meet the quality standards for food wheat.

Table 10

Winter wheat quality in the Northern Agricultural Zone of the Republic of Moldova, agricultural year 2024-2025

Locality	Variety	Harvest, t/ha	Moisture %	Protein, %	Gluten, %	Zeleny index, ml
Plop village, Donduseni district, “Agro-Panfil”	Alcantara	9.0	13.3	9.6	21	40
Plop village, Donduseni district, “Agro-Panfil”	Glossa	7.0	13.7	10.4	26	56
Vasileuti village, Riscani, 2025	Dumbravita	6.0	15.4	8.00	14	38
Vasileuti village, Riscani, 2024	Dumbravita	4.2	13.7	8.8	22	38
			DL_{05}=0,092	DL_{05}=0,231	DL_{05}=1,086	DL_{05}=4,805

CONCLUSIONS

The Northern agricultural zone of the Republic of Moldova is characterized by highly productive soils, expressed by high fertility potential, as consequence of the loam-clay and clay-loam texture.

The soil cover of the land is mostly made up of chernozems, lands suitable enough for field crops, including winter wheat.

In the texture of the researched leached chernozems, fine clayey and coarse dusty fractions predominate.

The soils of ecopedological districts 1 and 2, including those in Plop locality, Donduşeni

district have high natural fertility potential, with possibilities for applying effective fertility elements, fertilizers and others.

Under the production conditions of winter wheat in the 2024-2025 agricultural year, the researched production varied within the limits of 6-9 t/ha.

In agroecosystems with the application of individually reproduced seed material in farmers' households in the Northern agricultural zone of the Republic of Moldova, the harvest and quality of production was significantly inferior in quantity and quality, and the use of this product induces consequences of food insecurity.

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